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2003/2004 Conservation Requirements for Groundfish Stocks on the Scotian Shelf and in the Bay of Fundy (4VWX5Z), in Subareas 0, 2 + 3 and Redfish Stocks

Report to the Minister of Fisheries and Oceans

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Table of Contents

Letter to the Minister 4

Chapter 1: Introduction 6

Chapter 2: Scotian Shelf and Bay of Fundy, Stock-by-Stock Recommendations 11

- Cod - 4VsW 12
- Cod - 4Vn (M-O) 14
- Cod - 4X5Y 18
- Haddock - 4TVW 22
- Haddock - 4X5Y 26
- Pollock - 4VWX5Zc 30
- Flatfishes - 4VW 34
- Witch flounder - 4VWX 38
- Flatfishes - 4X5Y 40
- Silver hake - 4VWX 44
- Argentine - 4VWX 46
- Skates - 4VsW 48
- Wolffish - 4VWX+5YZc 50
- White hake - 4VW 52
- White hake - 4X5Zc 54
- Cusk - 4VWX 56
- Monkfish - 4VWX 60

Chapter 3: Redfish Stocks, Stock-by-Stock Recommendations 63

- Redfish Unit 1- 4RST+3Pn (Jan-May)+4Vn (Jan-May) 64
- Redfish Unit 2 - 3Ps4Vs4Wfg+3Pn4Vn (Jun-Dec) 68
- Redfish Unit 3 - 4WdehklX 72
- Redfish - 3O 74

Chapter 3: Newfoundland Groundfish Stocks, Stock-by-Stock Recommendations 77

- Haddock - 3LNO 78
- Redfish - 2+3K 80
- American plaice - 2+3K 82
- Witch flounder - 2J3KL 84
- Roundnose grenadier - Subarea 0 86
- Roundnose grenadier - 2+3 88
- Lumpfish 90
- Cod - 2GH 92
- Cod - 3Ps 94
- American plaice - 3Ps 98
- Haddock - 3Ps 100
- Pollock - 3Ps 102
- Skates - 3LNOPs 104
- Witch flounder - 3Ps 106

Appendices

- Science Priorities Letter to the Minister 2
- FRCC Mandate and Membership 5
- Acronyms 10

LETTER TO THE MINISTER

January 2003

The Honorable Robert G. Thibault, P.C., M.P.
Minister of Fisheries and Oceans
200 Kent Street
Ottawa, ON K1A 0E6

Dear Minister,

The Fisheries Resource Conservation Council (FRCC) herewith presents to you its report on *2003/2004 Conservation Requirements for Groundfish Stocks on the Scotian Shelf and in the Bay of Fundy (4VWX5Zc), in Subareas 0, 2+3 and Redfish Stocks.*

Your Council's advice follows its consideration of the most recent scientific advice from the Department of Fisheries and Oceans, its consultations with stakeholders in Atlantic Canada and written briefs submitted to Council. This report contains advice for stocks on the Scotian Shelf – Bay of Fundy, off the south coast of Newfoundland as well as some stocks on the Grand Banks.

The Council, over the years, in its advice on 3Ps cod, has delivered to you a suite of measures other than TAC that need to be followed year after year for conservation reasons. The 3Ps cod stock is the only good news story for cod in Atlantic Canada. It is imperative that Industry, DFO – Science, Management and Enforcement work closely in realizing the true potential of this stock. The Council is in the process of formulating a Fisheries Resource Conservation Plan (FRCP) for 3Ps cod. The plan incorporates strong conservation measures and sets the course for long term sustainability.

This report also includes the Councils advice on Scotian Shelf and Bay of Fundy stocks. While (4X5Y) haddock stock is the good news story, the cod stocks (4X, 4Vn, 4VsW) are not doing so well. The haddock stock in 4X5Y is showing great potential and for that reason we are recommending the TAC be increased for 2003/2004 to 10,000t from 8,100t where it has been since 1998. Fishermen are now reaping the benefits of the conservative approach to fishing this stock over the past several years. It is important to note that the haddock TAC may cause some by-catch problems with the 4X5Y cod and should be monitored closely. It is important to note that the rebuilding of 4X5Y cod may have been compromised in recent years by significant misreporting of catches reported by industry to DFO scientists and acknowledged in industry briefs to the FRCC. The FRCC is very concerned about these irresponsible fishing practices and is recommending strong action be taken to remedy this situation. Our recommendation in the Introduction Section of this report deals directly with this issue.

By-catch is still a concern of the Council. Many of the by-catch species were major contributors to the fishery and have to be monitored closely. These species have sustained up to four to five times the current landings and we must not lose sight of this potential harvest.

Minister, the Council is highlighting three major concerns in this report. First, this year there have been widespread reports of dumping and discarding from gillnet fishing in 3Ps due to environmental conditions (e.g. sea lice and hagfish). This situation needs to be monitored closely and action taken immediately if this condition persists. Not only is this a resource wastage, but unaccounted mortality will have serious implications on Science assessments of stock status.

Our second major concern is the state of the cod stock in 4VsW. Despite a ban on a directed fishery for this stock since 1993, Science is reporting that the biomass is still declining and may be in a free fall. As an example of its potential productivity, this stock supported a fishery of 30,000t only 10 years ago, while today's total SSB biomass is estimated to be less than 2,000t. As per our recommendation in the Introduction Section of this report, your immediate attention is required to ensure survival of this stock for future generations.

Finally, the Council is also concerned with the slow recovery of the 4X5Y cod stock which is not rebuilding to its true potential. In the SSR, Science states its highest concerns is with regard to unaccounted mortality and attributes this to the fact that the assessment scientists could not produce stock estimates based on a Virtual Population Analysis (VPA). Their stock status report states:

> *"Reports of cod being discarded or landed unreported to avoid exceeding the quota have increased. These anecdotal reports have been received from all sectors of the fishing fleet, with some indicating that the amount of cod recorded in landings data may be significantly less than is killed in the fishery in some areas. These reports bring into question the efficacy of quota management for cod in 4X, and the reliability of analyses which are dependent on landings data". SSR A3-05(2002), p.3.*

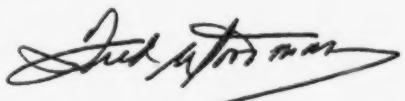
Our recommendation on this stock in this report reflects the above concern and presents a challenge to all those concerned and must be addressed prior to undertaking the upcoming fishing season.

In July 1997, the FRCC released its report *"A Groundfish Conservation Framework for Atlantic Canada"* (FRCC.97.R.3). That report was designed to provide a comprehensive blueprint for change in the Atlantic fishery. With many species not recovering e.g. Eastern Scotian Shelf cod, we need to revisit this document and explore every conservation recommendation. We owe it to the fish to do so.

More recently the Council has been working closely with industry in producing Fisheries Resource Conservation Plans (FRCP). Unfortunately, the Council was unable to adapt its FRCP to 4X5Y cod as planned. The lack of adequate information within the Stock Status Report (due to the unaccounted mortality leading to no VPA) and the lack of key assessment information normally provided by the Department are cited by Council members as being the main cause. The FRCPs are an important tool in adopting the long-term outlook and strategy for rebuilding some of the key stocks and the Council will be looking for your endorsement to achieve this goal.

Minister, we are your conservation Council, we are here to assist you in furthering conservation and re-building Atlantic groundfish stocks to a sustainable level.

Yours truly,



Fred Woodman
Chairman

CHAPTER 1: INTRODUCTION

SURVEILLANCE & CONTROL

Throughout its consultations in recent years, the Council has heard expressions of increasing concern from industry about DFO's lack of ability or lack of interest to effectively enforce conservation and management measures. This concern is directed towards the potential damage that some fishermen can exert on the various fish stocks. The concern is also directed towards the possible reaction of the Council or of DFO, who may make recommendations or decisions that will create extreme duress on the majority of fishermen who generally respect the 'rules'. A good illustration of this concern is with cod and haddock in 4X this year. Industry representatives are worried that the Council may decrease the cod TAC or not increase the haddock TAC, based in large part on perceptions of widespread abuse. This situation is not unique to 4X, or to the Scotia-Fundy Region. Discarding and underreported landings are reportedly on the increase and reaching very serious levels in some areas. The Council also hears that while this type of activity has been relatively limited, the lack of detection and effective punishment of abusers is creating an incentive for others to also cheat the system. This type of activity also negatively affects the quality of stock assessments, the trust in fisheries science, and the integrity of the TAC and quota management system.

The Council does not wish to be alarmist about these reports. However, at a minimum, there appears to be an emerging crisis of confidence in relation to the ability of the system to control activities on the water and at dockside. It is clear that actions need to be taken to address this problem. The fishing community, the FRCC and the policy makers must know the extent to which real problems exist with our surveillance and enforcement system. The extent of these problems and the effectiveness of the solutions are significant conservation issues.

The FRCC recommends that DFO create a small task force, seeking input from industry representatives as appropriate, to evaluate and report publicly on the effectiveness of and potential improvements to the surveillance and enforcement system in the various regions in Atlantic Canada.

The results from this task force may not be available for use in the 2003-2004 season. **Therefore, the FRCC further recommends that DFO immediately consider the following measures for the groundfish fishery in Scotia-Fundy: (a) 100% dockside monitoring for all sectors (b) the designation of approved landing ports if/where necessary (c) increased at-sea observer coverage on a targeted basis (d) increased at-sea boardings on a targeted basis (e) phasing in mandatory use of black boxes, etc.**

The FRCC further recommends that DFO employ the use of technology and systems to ensure that all C&P-related information is fully integrated and can be utilized to target enforcement action on a real-time basis.

The Council doubts that financial constraints faced by the Department will be addressed to the point where significant new government resources will be added to its enforcement capability. The Council also recognizes that the answer should not be to simply impose a significantly increased cost structure on the entire industry (who also have significant financial constraints) in a non-targeted fashion. At least part of the solution must be to create a self-policing system within the industry, involving the industry to a much greater extent than has been done in the past. The experience of other industries and of fisheries in other jurisdictions might be instructive in this regard.

The FRCC recommends that DFO designate personnel who would be charged with the authority and responsibility to work with industry groups 'on the ground' to develop new and innovative approaches to create effective self-policing systems that can be integrated with C&P.

Finally, the Council concurs with industry views that it is absolutely essential for the penalty system to be empowered to enable repeat offenders of serious infractions to be removed from the fishery.

EASTERN SCOTIAN SHELF

The Council is increasingly alarmed with the situation on the Eastern Scotia Shelf, where there appears to be a sustained failure of most groundfish stocks. With the notable exception of haddock, virtually all groundfish stocks in this area have not recovered since directed fishing terminated or was seriously curtailed as the individual case may be. In some cases, notably cod, the stock has continued to decline on a perilous slope even in the absence of fishing for almost a decade. Most cod stocks in Atlantic Canada are in difficulty. However, the poor productivity regime on the Eastern Scotian shelf extends to all groundfish stocks. Even haddock is

suffering greatly from very poor somatic growth rates and unaccounted high natural mortality, as is virtually all groundfish in the area.

One of the first thoughts among fishermen as to the cause of the poor health of groundfish stocks in this area is seals. It is clear that seals have had and are having a significant negative impact on some species such as cod. However, it is also clear that groundfish consumption by seals is not the cause of poor somatic growth rates. It is also believed that colder than normal water has in some way been a negative factor. While colder than normal water was present from the mid-1980s through the mid-1990s, this has not been the case in recent years. There are observations that increasing seismic activity through the 1990s corresponded with increasing problems with groundfish stocks, fueling speculation that seismic testing continues to kill eggs and larvae and disrupt spawning. The lower weights-at-age of most groundfish species have led to theories that the food chain has been significantly disturbed. Some fishermen point to the relative absence of herring as feed in the area. Others wonder whether the abundance of phyto-plankton has declined or the composition of zoo-plankton has changed. It is also not insignificant that the regime shift that has occurred has been very positive for species such as shrimp and crab.

It is obvious that if the answers were simple, then these issues would not still be before us. However, the Council is of the opinion that this situation is so serious that it warrants a special and focused scientific investigation. We should not continue to allow ourselves to be content with having only unanswered questions.

The FRCC recommends that DFO Fisheries Science establish a multi-disciplinary task force, drawing on international expertise as appropriate, to address factors related to the poor productivity regime being experienced on the Eastern Scotia Shelf:

- **to consolidate and investigate all available biotic and abiotic information**
- **to consider and evaluate various hypotheses on what is occurring in the ecosystem on the Eastern Scotian Shelf**
- **to develop an agreed set of working assumptions on these dynamics**
- **to report on its findings within 12 months.**

The Council observes that the offshore oil and gas industry has funds available for environmental research, and considers this as a potential source of funds to underwrite part of the cost of this task force.

Species & Fisheries Interaction

In our January 2002 Report, the Council emphasized the need to develop working hypotheses with respect to species and fisheries interactions, and to begin to incorporate these hypotheses into a conservation and management framework.

The FRCC reiterates its previous recommendation that DFO work with industry groups representing the different fisheries, to organize a series of targeted discussions designed to review relevant information on designated species interactions (e.g. cod and herring), and to identify and evaluate options (e.g. designated restricted areas) to reduce the potential negative impact from one fishery to the other.

Stock Structure And Dynamics

In our January 2002 Report, the Council emphasized the need to develop working hypotheses with respect to individual spawning and juvenile areas, and the movement of spawning and juvenile concentrations, and to begin to incorporate these hypotheses into a conservation and management framework.

The FRCC notes with disappointment the reluctance of Fisheries Science to utilize fishermen's traditional knowledge about stock dynamics. However, the Council considers this information to be important.

The FRCC recommends that DFO Fisheries Science work with the fishing industry to articulate, 'map' and utilize working assumptions on these stock components and their dynamics, and to make this information available to the FRCC and the public in an appropriate format. The FRCC would appreciate the opportunity to participate in the planning process for this project.

Atlantic Halibut

The RAP process annually provides separate Stock Status Reports (SSR) for some stocks, and 'Updates' for other stocks based on the recent fishery and survey data. There was no report on Atlantic Halibut produced by Fisheries Science in 2002. In its November consultations, industry expressed great disappointment given the efforts and contribution it has made through the Joint Industry/DFO Longline Halibut Survey. Fisheries

Science has advised the Council that a report on Atlantic Halibut will be forthcoming in March 2003.

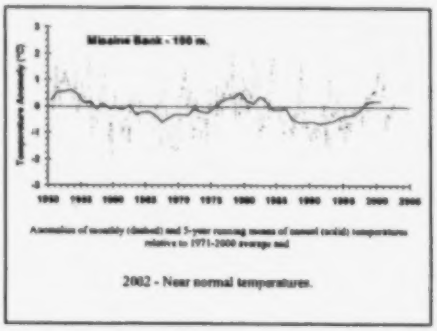
Fishermen hold the view that this stock is steadily improving. In light of this perspective, and in consideration of the fact that the upcoming report from Fisheries Science is expected to include important information from the longline survey that was specifically designed for Atlantic Halibut, the Council has decided to defer its recommendations for 2003-2004 until early 2003. The Council intends to consult with stakeholders when the report from Fisheries Science is available.

Fisheries Resource Conservation Plans (FRCPs)

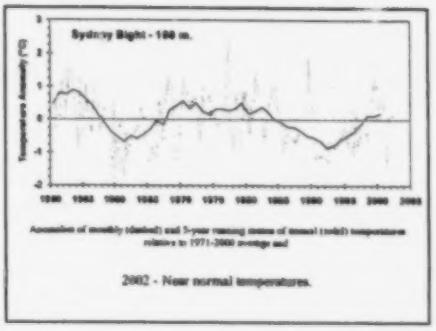
Over the past two years, the Council engaged industry and DFO in a consultation process on the development of longer-term conservation plans (FRCPs) for groundfish stocks in Atlantic Canada. In the Scotia Fundy Region, the initial focus was on 4X5Y cod and haddock. As a result of a special meeting held in June 2002, Fisheries Science committed to provide information and advice on parameters for stock conditions and productivity, as well as an agreed set of background information on these two stocks, which would be used by the Council to finalize the construct and application of the FRCPs. The Council observes with great disappointment that Fisheries Science did not forward the core information necessary to advance towards completion of the FRCP for these two stocks. In part as a result of this, the Council finds itself in a position of not being able to fully utilize the FRCP for 4X5Y cod and haddock in making its conservation recommendations for 2003-2004. Despite this setback, the Council has incorporated a number of features of the draft FRCP into its recommendations for 2003-2004. It is hoped that Fisheries Science will forward the agreed information in the near future, and that the FRCPs for 4X5Y cod and haddock, and other species, are applied in 2003.

Environment

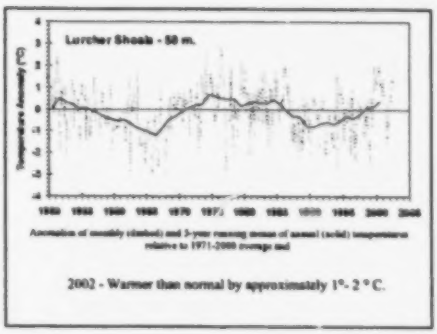
After colder than normal temperatures throughout much of the 1990s, with the exception of Emerald Basin, the near-bottom temperatures across the Scotian Shelf are slightly above the 1971-2000 average.



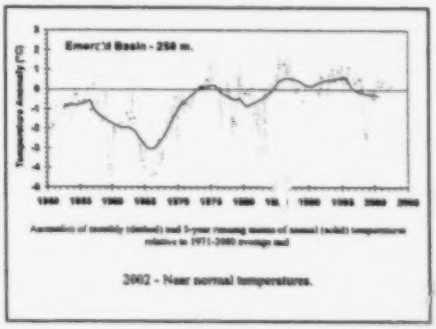
2002 - Near normal temperatures.



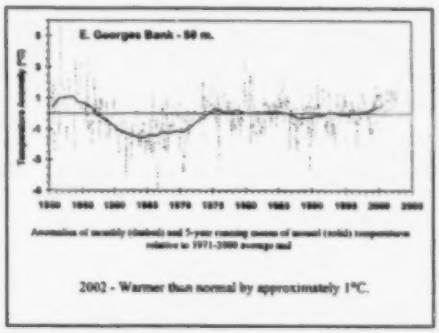
2002 - Near normal temperatures.



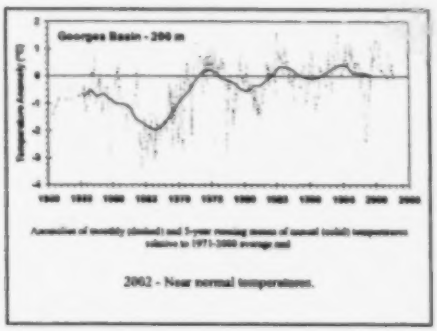
2002 - Warmer than normal by approximately 1°- 2 °C.



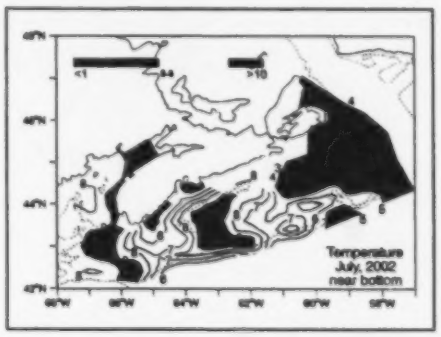
2002 - Near normal temperatures.

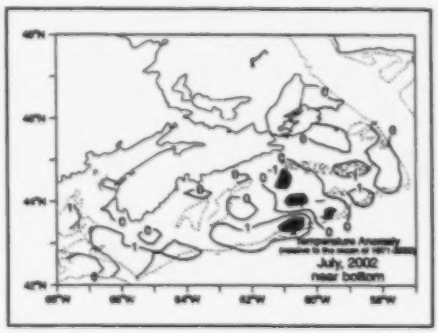


2002 - Warmer than normal by approximately 1°C.



2002 - Near normal temperatures.

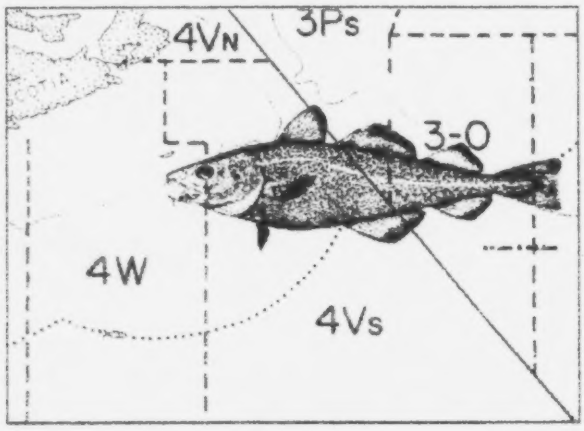




Source: DFO Science, Maritime Region

Chapter 2: Scotian Shelf and Bay of Fundy Groundfish Stocks, Stock-by-Stock Recommendations

COD - 4VSW



PERSPECTIVE

The cod stock in 4VsW has supported a commercial fishery since the 1800's. Since 1977 this has been predominantly a Canadian fishery, with trawlers having accounted for 70-75% of landings with the majority of the remaining harvest done by longliners.

The cod resource on the eastern Scotian Shelf is a complex of spawning components including at least two major offshore groups (Western/Sable and Banquereau Banks) and a chain of smaller coastal spawning groups. The situation is complicated by the presence of both Spring and Fall spawning in several of the spawning areas. Growth rates differ between 4Vs and 4W so that in the 1970's, fish in 4Vs reached 68cm on average at age 7 while in 4W they reached 72cm. In the mid-1980's, growth declined in both areas and the average length at age 7 dropped to 39cm by 1993.

Catches from 1970-1989 averaged 44,000t. Following a drastic decline, the FRCC recommended in September 1993 that the fishery be closed. Limited removals (less than 400t) have continued since the moratorium for the purposes of Sentinel Surveys and by-catch for other fisheries.

In 2002, consultations on 4VsW Cod were held in Yarmouth (November 19), Bedford (November 20) and Port Hawkesbury (November 21). While 4VsW Cod was not discussed at great lengths, there was general agreement with the Stock Status Report (SSR) update which indicated that this stock was in poor condition. However, fishermen feel that grey seals, seismic exploration, and lack of food are important problems and that the stock cannot be expected to rebuild without addressing these issues, seals in particular.

ANALYSIS

The last full assessment of this stock was conducted in 1998. Annual updates have been conducted since. The 1998 DFO Stock Status Report and the 2002 Maritimes Region Groundfish Update indicate that:

- Based on survey data, since the mid-1980s there has been an increase in the mortality of cod, other than attributable to fishing, which has persisted even after the closure of the industry.
- The scientific evidence indicated that the increase in mortality from sources other than reported landings includes discarding, direct and indirect effects of harsh environmental conditions, and predation by seals.
- The spawning stock biomass (5+) is less than 2,000t, the lowest recorded and has been declining since 1998. Making plausible assumptions about seal consumption and other natural mortality, the biomass is projected to decline, even in the absence of any fishery.
- The models of cod consumption by grey seals imply between 5,400t to 22,000t of cod being removed by seals. These are high removals compared with the estimated 5+ biomass of less than 2,000t reported above, and relative to the cod by-catch in other groundfish fisheries.

The FRCC continues to be concerned about the very low productivity of this stock and the continued decline of the spawning stock since the fishery closure in 1993. Two key issues are thought to be related to the poor productivity of the stock:

1) *Environment:* In 1998, this area experienced lower than normal water temperatures and scientists reported an increase in cold-water species such as capelin in this area. In 1999 and 2000, this cold-water trend seems to have dissipated. It was hoped that the warmer water in the area since 1999 would have a positive effect on recruitment, but this does not seem to have occurred.
2) *Seals:* The mean percentage of cod (mainly of younger ages) in the grey seal diet has remained at about 12%. Given that the grey seal population has apparently continued to increase at the same rate as previously meas-

Figures are in 000t

Year	1986	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	55	48	44	38	35.2	35.2	35.2	35.2					No directed fishery					
Catch	57.8	57.1	45.5	36.2	37.2	34.3	33.2	29.8	3.2	0.35	0.28	0.24	0.25	0.26	0.29	0.15	0.1	0.072

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

ured, the estimate of consumption of 4VsW cod by grey seals in 1997 was between 5,400-22,000t.

The distribution of catches in the Sentinel Surveys show most of the cod are found on the 4W banks (Western, Sable, Emerald) throughout the year. The Sentinel Survey distribution also indicates that, at least during the autumn, there are concentrations of cod in the nearshore areas.

Currently, 4VsW cod removals from Sentinel fisheries and by-catch from other fisheries are less than 150t.

The short-term prospects for the stock and for the fishery remain dismal. The productivity of the stock is very low. Several factors have caused increased mortality including seal predetation on the younger age groups. The spawning stock biomass is estimated to have been declining since 1998. The FRCC has not changed its outlook on this stock.

The FRCC recommends that there be no directed fishery for cod in 4VsW in 2003/2004, that measures to minimize by-catches of 4VsW cod in all fisheries directed at other species should be maintained with an absolute limit of 150t, the estimated catch for 2000/2001. Once this limt is reached all directed fisheries for other species would be stopped. The FRCC further recommends that no recreational or food fisheries take place given the very precarious state of the cod stock in this area, and that the Sentinel Survey continue for the 2003/2004 fishing year. Remaining areas of cod concentrations should be identified and closed to all groundfish fishing. In addition, activities by other ocean users in those areas should be examined and consideration should be given to prohibit those that are considered to have a negative impact on cod and other depleted fishery resources.

Given the continued decline of the stock despite extremely limited fishery removals since the closure of the fishery in 1993, the FRCC recommends that a comprehensive review of the factors preventing the recovery of 4VsW cod be undertaken and that potential additional measures to promote the recovery of the stock be identified. The factors to be reviewed should include the spawning potential, the effects of environmental conditions and ecological interactions, including food availability and seal predation, as well as seismic exploration.

Sources

DFO Science

SSR A3-03 (1998) Eastern Scotian Shelf Cod

SSR A3-35 (2002) Update on selected Scotian Shelf Groundfish stocks in 2002

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

Written Briefs

Eastern Nova Scotia 4VsW Management Board (2002-010-00183)
Debbie MacKenzie (2002-010-00212)
Debbie MacKenzie (2002-010-00213)

Council's Views on Stock Status

Overall Indicator:	collapsed
	Compared to average
Spawning Biomass:	lowest recorded
Overall Biomass:	well below average
Recruitment:	below average
Growth and Condition:	below average
Age Structure:	below average (smaller fish at age)
Distribution:	below average
Recent Exploitation Level:	fishery closed since September 1993

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	55	48	44	38	35.2	35.2	35.2	35.2					No directed fishery					
Catch	57.8	57.1	45.5	38.2	37.2	34.3	33.2	29.8	3.2	0.35	0.28	0.24	0.25	0.26	0.26	0.13	0.1	0.072

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

ured, the estimate of consumption of 4VsW cod by grey seals in 1997 was between 5,400-22,000t.

The distribution of catches in the Sentinel Surveys show most of the cod are found on the 4W banks (Western, Sable, Emerald) throughout the year. The Sentinel Survey distribution also indicates that, at least during the autumn, there are concentrations of cod in the nearshore areas.

Currently, 4VsW cod removals from Sentinel fisheries and by-catch from other fisheries are less than 150t.

The short-term prospects for the stock and for the fishery remain dismal. The productivity of the stock is very low. Several factors have caused increased mortality including seal predetation on the younger age groups. The spawning stock biomass is estimated to have been declining since 1998. The FRCC has not changed its outlook on this stock.

The FRCC recommends that there be no directed fishery for cod in 4VsW in 2003/2004, that measures to minimize by-catches of 4VsW cod in all fisheries directed at other species should be maintained with an absolute limit of 150t, the estimated catch for 2000/2001. Once this limt is reached all directed fisheries for other species would be stopped. The FRCC further recommends that no recreational or food fisheries take place given the very precarious state of the cod stock in this area, and that the Sentinel Survey continue for the 2003/2004 fishing year. Remaining areas of cod concentrations should be identified and closed to all groundfish fishing. In addition, activities by other ocean users in those areas should be examined and consideration should be given to prohibit those that are considered to have a negative impact on cod and other depleted fishery resources.

Given the continued decline of the stock despite extremely limited fishery removals since the closure of the fishery in 1993, the FRCC recommends that a comprehensive review of the factors preventing the recovery of 4VsW cod be undertaken and that potential additional measures to promote the recovery of the stock be identified. The factors to be reviewed should include the spawning potential, the effects of environmental conditions and ecological interactions, including food availability and seal predation, as well as seismic exploration.

Sources

DFO Science

SSR A3-03 (1998) Eastern Scotian Shelf Cod

SSR A3-35 (2002) Update on selected Scotian Shelf Groundfish stocks in 2002

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

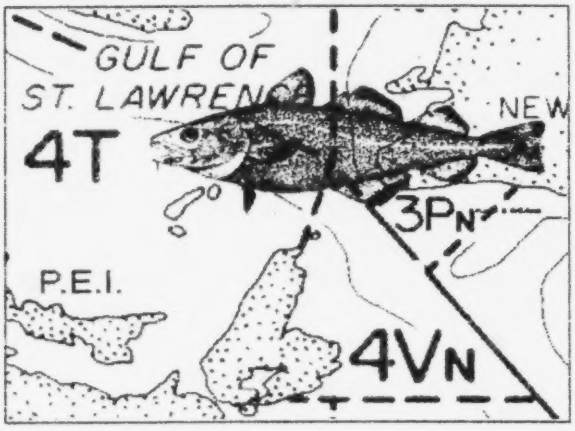
Written Briefs

Eastern Nova Scotia 4VsW Management Board (2002-010-00183)
Debbie MacKenzie (2002-010-00212)
Debbie MacKenzie (2002-010-00213)

Council's Views on Stock Status

Overall Indicator:	collapsed
	Compared to average
Spawning Biomass:	lowest recorded
Overall Biomass:	well below average
Recruitment:	below average
Growth and Condition:	below average
Age Structure:	below average (smaller fish at age)
Distribution:	below average
Recent Exploitation Level:	fishery closed since September 1993

COD - 4VN (M-O)



PERSPECTIVE

Cod landings in NAFO Subdivision 4Vn have declined since 1985 until the closure in 1993. Throughout most of the 1980s catch quotas restrained the fishery, but after 1990 the catch was substantially less than the TAC. In September 1993, the cod fishery was closed. This moratorium is still in effect. In the few years prior to closure, vessels using mobile gear generally managed to maintain a catch close to their allocation, whereas the longline fleet fared less well. Mixing of Gulf of St. Lawrence (4T) cod with the resident stock and the inability to accurately apportion landings according to stock has complicated the assessment and management of 4Vn cod. Prior to 1993 the fishery was defined for the months May – November, afterwards it was re-specified from May-October to more closely correspond to the migration of fish from the Gulf of St. Lawrence.

From 1960-1975 4Vn cod was landed by Russia, Spain, Portugal and France as well as domestically by Canada. Between 1975-1985 only France and Canada participated in the fishery, and since then all are domestic catches.

Since 1960, catches averaged around 6000t/year with a high of 12,000t being caught in the mid 1960s and the 1980s, until the last decade where only 660t has been the average annual catch.

Consultations on 4Vn cod (M-O) were held in Port Hawkesbury, Nova Scotia on November 21, 2002. Generally fishermen expressed the view that the cod stock does not seem to be in as much difficulty as it is portrayed in the Stock Status Report (SSR). However, cod appeared to be more abundant in the deep waters, with very few cod located in shallow waters near shore. Fishermen reported that Commercial Index catch rates were not taken in account in the stock assessment. Some fishermen were under the impression that the Commercial Index data had to be scientifically accepted for the survey to be conducted. It was understood by fishermen that what they report as commercial catches should provide some indication on the health of the stock. This issue of the Commercial Index catch rates not being used by DFO due to perceived failure to follow protocol is an extremely sore point with the fishermen. Another topic that was discussed intensely was the effects of the sum of all the oil and gas exploratory work taking place around Nova Scotia waters, especially in the neighbouring 4VsW. Seismic surveys were viewed by fishermen as having a dramatic negative effect on fish. Some argued that the larval fish were being harmed by the blast of the seismic equipment while others reported that commercial sized fish disappear from the area for weeks after the seismic testing takes place.

ANALYSIS

The 4Vn (M-O) cod fishery has been closed since September 1993. Nevertheless, the stock shows little sign of recovery, largely due to lack of recruitment. Total catches of 71t of cod were taken by the Sentinel activity and by-catch in redfish, flatfish and halibut fisheries in 2002 as of November 5. The Sentinel survey continued again this year as did the Commercial Index Fishery. The total landings permitted under these two options are 275t but catches are considerably less. The stock is monitored by annual DFO groundfish trawl surveys in July. In addition, a "Sentinel Survey" employing commercial longliners, inaugurated in September 1994, has been conducted. July and September surveys have taken place on an annual basis since. Both these surveys gave a similar picture of the stock status. Until there is substantial recruitment, and it survives to reproductive age, there are no prospects for a re-opening of this fishery.

Again this year, the Council continues to be concerned with the poor recruitment from the 1988 to 1996 year-classes, although there have been recent signs of improved recruitment. The 2002 SSR indicates that the 1998 and 1999 year-classes are above average. The SSR also notes that the estimates of total mortality from the July survey indicate that natural mortality could greatly exceed the 0.2 level traditionally assumed. This high mortality and current low stock production implies slow stock rebuilding. The assess-

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	12	12	9	7.5	7.5	7.5	10	10	No directed fishery									
Catch	12.1	12	10.3	8.9	7.3	4.9	4.8	4.2	0.8	0.06	0.05	0.05	0.05	0.043	0.075	0.05	0.13	0.07

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

ment of this stock has high uncertainty and the Council recommends that the information gathered by the 4Vn Sentinel Survey and Commercial Index Fishery programs be continued and provide additional information on this stock.

The FRCC recommends that the Sentinel Survey and Commercial Index Fishery continue as in past years. Total removals from the Commercial Index Fishery should not exceed 100t, the approximate average since it started.

The FRCC believes that such a limited Index Fishery will enable industry to gain a perspective on the abundance, size composition, distribution, and availability of cod and other species at different times of the year. As in other Index Fisheries, the knowledge thus gained by the industry helps the FRCC obtain a better perspective on the status of resources in the area.

In previous years, the Council recommended that fishing on 4TVn cod during its over-wintering in 4Vn (November to April) should only take place to the extent that there is high confidence that catch of 4Vn resident cod is minimal. DFO recently approved a Winter fishery under restrictive conditions in the 4Vn over-wintering area on the basis of results from a joint DFO/industry study that had been previously peer reviewed, but had not yet been published. Some industry representatives expressed their concern for DFO's decision to reopen the winter fishery on cod in the 4Vn area at this time. The Council notes that the latest stock status reports for the 4Vn and 4VsW cod stocks that mix with 4TVn cod in the area of Sydney Bight find that they are increasingly in a severely depleted state and show no recovery since they were closed to commercial fishing in 1993.

The study concludes that at current biomass levels of the respective stocks, the catch of resident cod during the Winter fishery directed towards 4TVn cod is estimated to be 3-5%. DFO advised that the restrictions on the Winter fishery are designed to reduce this percentage even further. The Council notes that uncertainty remains and is still concerned about the mixing problem in that area.

The FRCC, therefore, recommends that the 4TVn cod winter fishery in 4Vn be closely monitored and that DFO assessment scientists develop appropriate methodologies to estimate 4Vn and 4VsW cod removals to be accounted for in their respective stock assessments. The FRCC also recommends that the joint DFO/industry study be made public and that DFO Fisheries Science continues to corroborate the results of the study.

In other regions and bays, acoustic surveys for cod prove valuable to assist in determining the absolute biomass.

The FRCC recommends that DFO Science, in consultation with the 4Vn fishery participants evaluate the feasibility of conducting other survey options to assist in determining the current absolute biomass.

At consultations, the Council heard from fishermen that there were still many grey seals around the Bird Island area and that they feared that the juvenile groundfish in the immediate area were being consumed at an alarming rate. This cod stock, not unlike many cod stocks Atlantic wide, experiences high natural mortality. This 4Vn (May to October) cod stock may be a good candidate to attempt to determine causes of this high mortality and evaluate the seal predation portion.

Last year's recommendation of evaluating Bird Island as a seal exclusion zone for the protection of juvenile groundfish is still deemed necessary.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	12	12	9	7.5	7.5	7.5	10	10					No directed fishery					
Catch	12.1	12	10.3	8.9	7.3	4.9	4.6	4.2	0.6	0.06	0.05	0.05	0.05	0.043	0.075	0.05	0.13	0.07

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

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In previous years, the Council recommended that fishing on 4TVn cod during its over-wintering in 4Vn (November to April) should only take place to the extent that there is high confidence that catch of 4Vn resident cod is minimal. DFO recently approved a Winter fishery under restrictive conditions in the 4Vn over-wintering area on the basis of results from a joint DFO/industry study that had been previously peer reviewed, but had not yet been published. Some industry representatives expressed their concern for DFO's decision to reopen the winter fishery on cod in the 4Vn area at this time. The Council notes that the latest stock status reports for the 4Vn and 4VsW cod stocks that mix with 4TVn cod in the area of Sydney Bight find that they are increasingly in a severely depleted state and show no recovery since they were closed to commercial fishing in 1993.

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Last year's recommendation of evaluating Bird Island as a seal exclusion zone for the protection of juvenile groundfish is still deemed necessary.

Council's Views on Stock Status

Overall Stock Indicator:	uncertain
	Compared to average
Spawning Biomass:	below long term average
Total Biomass:	below long term average
Recruitment:	slight signs of improvement
Growth and Condition:	condition factor below long term mean
Age Structure:	average but low in absolute abundance
Distribution:	larger fish concentrated along the slope, smaller fish found inshore
Recent Exploitation Level:	below $F_{0.1}$ since 1994.

Sources

DFO Science

SSR-A3-02(2002) Cod in Sydney Bight (4Vn).

FRCC Consultations

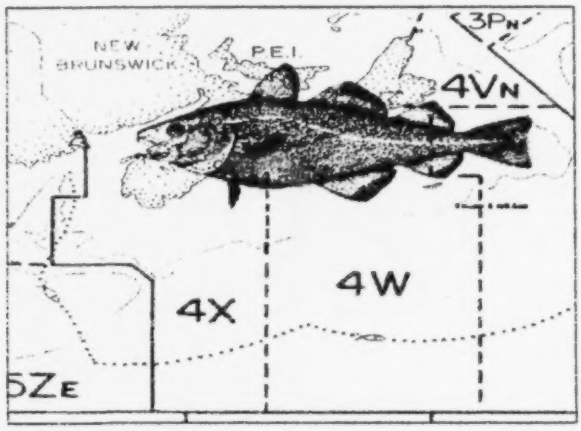
The FRCC held a public consultation on this stock in:

Port Hawkesbury (November 21)

Written Briefs

Kevin Nash - Fisherman (2002-010-00211)
North of Smokey Fishermen's Association – Osborne Burke (2002-010-00215)

COD - 4X5Y



PERSPECTIVE

Juvenile cod in 4X5Y feed on a wide variety of invertebrates and as they grow, they include fish in their diet. Cod in 4X5Y reach 53cm on average by age 3 years, increase to 72cm by age 5 and 110cm by age 10. First reproduction generally occurs at age 3 and individual females tend to spawn several batches of eggs during a single spawning period. The fecundity of females at first maturity is low then increases dramatically with age. Seasonal migrations associated with spawning cod occur over a number of spawning areas in 4X5Y, the largest occurring during winter on Browns Bank where peak spawning occurs during the winter.

Cod in 4X5Y have been fished commercially since the 1700s. Until the 1960s, the cod fishery was primarily an inshore fishery. Following extended jurisdiction to 200 miles in 1977, 4X5Y cod has been predominantly a domestic fishery. Reported cod landings since 1985 have been below 30,000t. Average landings since 1995 are below 10,000t. An annual TAC of 6,000t for each of the seasons 2000/2001, 2001/2002 and 2002/2003 was announced by the Minister of Fisheries and Oceans on March 31, 2000. The Minister stated that a key element of his plan was the establishment of a rebuilding objective of a spawning biomass of 40,000t by 2003. DFO was to closely monitor the progress towards rebuilding the SSB, and the FRCC would advise on the progress. The announcement also stated that, should the rebuilding target not be met, reductions in catch or complete closure would be implemented in subsequent years. Enhanced fishery monitoring by his department was also included in the plan.

There are two dominant gear types that exploit this stock: mobile draggers (less than 65 feet LOA) and fixed gear (longline/handline and gillnets - small boat, also less than 65 feet LOA fixed gear). Historically, this fishery has been dominated by mobile gear except during 1990-93 when the proportion of landings taken by fixed gear was greater. The groundfish fishery in 4X5Y is prosecuted throughout the year with fleets adjusting their timing for weather and fish abundance. The ITQ fleet (MG<65') adapts its fishing strategy to available quotas and is now more seasonal in fishing pattern depending on quota availability and markets. The small fixed gear fleets fish primarily in June and July with larger vessel (>65' LOA) and ITQ participation during the Fall period. The <45 ft fixed gear fleet presently has the greater share of the cod quota.

INTERIM STOCK OBJECTIVES

The Council has made recommendations for 4X5Y cod based on objectives and conservation measures for 4X5Y cod. In consultation with the 4X5Y fishing industry, the Council has prepared a long-term Fisheries Resource Conservation Plan (FRCP) for 4X5Y cod and haddock. The objectives of the plan are:

1. Conservation and Rebuilding of Commercial Groundfish Stocks

a) **Ecosystem Health**. To prevent or to mitigate human disturbances of species diversity, genetic variability, ecosystem productivity, structure, and function, and marine environmental quality of target and non-target species.

b) **Rebuild.** To rebuild the spawning stock biomass to the target range.

c) **Conserve.** To identify, monitor, and avoid over-exploitation of individual spawning stock components and juvenile rearing areas within the management area.

d) **Research.** To investigate, monitor and establish strategies regarding the reproductive capacity of the stock, substock components, and interactions with other species in the ecosystem.

2. Sustainable Utilization and Relative Stability in the Fishery and Management Regime

a) **Sustainable use.** To conserve the ecosystem functions for the use of future generations.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	30	20	17.5	14	12.5	12	26	26	15	13	9	11	13	9.3	7	6	6	6
Catch	20	19.2	18.5	19.1	19.4	22.7	26.7	25.5	15.8	13.1	8.8	10.8	11.5	8.28	7.11	5.9	5.9	4.5

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

b) **Long-term view.** To adopt a longer-term view of stock management linked to spawning stock biomass levels and other indicators associated with the health of the stock.

c) **Affirm Fluctuations.** To acknowledge that conservation decisions relate to stocks that are subject to natural fluctuations within a dynamic and complex ecosystem.

The FRCC and fishermen in 4X5Y are continuing their work toward applying these objectives in the mixed cod and haddock fisheries in 4X5Y.

Analysis

The 2002 4X5Y cod Stock Status Report indicates:

- Reported landings and TAC declined through the 1990s and were 6,000t annually from 2000-2002.
- Recruitment has improved starting with the 1998 yearclass, but remains below average.
- Biomass has increased since the late 1990s but remains low.
- Growth rate and condition show no trends.
- Total mortality has remained high despite restrictive TAC's.
- High mortality does not appear to indicate increased natural mortality but is consistent with anecdotal reports of discarding and unreported landings of cod.
- Given the improved recruitment, biomass should continue to increase. The full benefit of the 1998-2000 yearclasses toward stock rebuilding will not be realized if mortality cannot be reduced to moderate levels.

Consultations for this stock were held in Yarmouth, Bedford and Port Hawkesbury, Nova Scotia, in November 2002. During consultations, fishermen reported that both the 4X5Y cod and haddock stocks are improving. The cod stock is the one that needs more attention due to the fact that cod are widely distributed across the entire range and its catchability to gears is generally greater than haddock. Also the cod stock is still rebuilding from a low level. Generally, the fixed gear sector has more difficulty avoiding cod while directing for haddock. Fishermen claimed that the anecdotal reports of dumping, discarding and unreported landings were not as widespread as indicated in the SSR and were being conducted by a few renegades and that the culprits should be stopped. Fishermen are adamant that the unaccounted mortality of the 4X5Y cod stock must be halted immediately allowing scientists to provide credible information on stock status.

The 4X5Y Cod fishery is currently in the final year of the three-year plan with TACs of 6,000t. The objective of the plan was to rebuild the spawning stock biomass to levels above 40,000t by 2003. Although, the 2002 4X5Y cod SSR is not directly informative on whether the SSB target will be achieved, indications are that it will not.

The SSR indicates, and the industry agrees, that the stock is rebuilding even though catches are believed to have exceeded the TAC. In 2002, the Council learned that in recent years the fishery has been plagued with unacceptably high discarding of catches and non-reporting of landings. These practices have slowed rebuilding, introduced large uncertainties in the assessment and must be stopped. Eliminating these poor fishing practices is the greatest challenge to effective fishery management in this fishery.

The Council recommends that a Task Force lead by DFO Fisheries Management, including the industry and DFO Science be charged with designing a system to ensure that total removals do not exceed 6,000t in 2003/2004.

No directed fishing should be allowed until a satisfactory system has been approved and implemented.

If, after the 2003/2004 fishing season, the Council concludes that the situation has not been satisfactorily remedied, it will advise that the fishery be substantially reduced.

At FRCP consultations, fishermen complained that the stock assessments do not convey what they experience on the water and, therefore, fixed gear fishermen would like to contribute to the science process by providing their own survey data that can be analyzed, peer reviewed, and accepted at the Regional Assessment Process (RAP), similarly to the ITQ survey. The Council recently raised this issue with Fisheries and Oceans' Regional Director-General, Maritimes Region, who has undertaken to discuss this with industry.

The FRCC recommends that the Scotia Fundy Groundfish Advisory Committee be the venue in which discussions on designing and implementing a fixed gear survey are fully explored.

The FRCC reiterates its strong support for the efforts of DFO Science to carry out a cod tagging program in order to learn more about in-season cod movement, substocks, and possible spawning locations and timing in 4X5Y. Extension of the current program to include the joint industry-DFO ITQ survey would provide wider results for future analysis.

The FRCC recommends that DFO Science, in consultation with industry, report on the tagging program in 4X5Y, on information about seasonal cod (and other groundfish) migration patterns and spawning location and dynamics as the information becomes available.

Sources

DFO Science

SSR A3- 05 (2002) Southern Scotian Shelf and Bay of Fundy Cod

NR-HQ-00-11 News Release- Fisheries and Oceans Canada

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

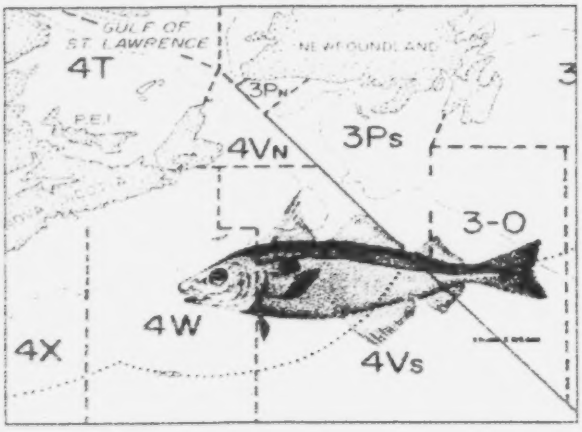
Written Briefs

Yarmouth County Fixed Gear Association – C. Davis & L. Blackler (2002-010-00178)
Shelburne County Quota Group – Gary Dedrick (2002-010-00188)
Nova Scotia Fish Packers Association – Denny Morrow (2002-010-00204)
Inshore Fisheries Limited – Claude d'Entremont (2002-010-00205)
Charlesville Fisheries Ltd. – Raymond Belliveau (2002-010-00206)
Scotia Fundy Inshore Fishermen's Association – E.L. Walters (2002-010-00207)
Scotia Fundy Mobile Gear Fishermen's Association (2002-010-00210)
Shelburne County Competitive Fishermen's Association – P. Decker & V. Wolfe (2002-010-00187)
Maritime Fishermen's Union Local 9 S.W. Nova – Hubert Saulnier (2002-010-00189)

Council's Views on Stock Status

Overall stock Indicator:	low and rebuilding towards the target of >45,000t SSB by 2006
	Compared to average
Spawning Biomass:	increasing from historically low levels; anticipated improved recruitment from the 1998, 1999 and 2000 year-classes
Total Biomass:	same as above
Recruitment:	below historical average but improved in recent years, especially 1998 and 1999yc and 2000yc
Growth and Condition:	continues to be good
Age Structure:	older ages comprise less than expected proportion of landings, 3 above average year classes (ages 3-10)
Distribution:	both area occupied and local density are low
Recent Exploitation Level:	reached a high in 1992; declined since

HADDOCK - 4TVW



PERSPECTIVE

This stock is located primarily in 4VW along the north-eastern portion of the Scotian Shelf. Reported landings averaged almost 30,000t in the 1950s, 25,000t in the 1960s, 5,000t in the 1970s and 11,000t in the 1980s. Fishing mortality was very high in the early 1970s, it showed a jagged decreasing trend until 1988 before increasing steeply until 1993. The directed fishery was closed in 1994 and has remained closed since then. Fishing was not the only cause of the precipitous decline in stock biomass and in the growth rate of the fish from the mid – 1980s to 1993. Harsh environmental conditions appear to have contributed to these declines. In 1999, environmental conditions returned to more normal ranges. The 1998 year-class is above average and the 1999 year-class appears to be exceptionally strong.

A large closed area covering much of Emerald and Western Banks (i.e. the Haddock Box) is a significant feature of this stock and its habitat. This closed area was implemented in 1993 to encompass what were considered to be major juvenile haddock areas. While the boundary of the area has been debated in relation to its effectiveness as a juvenile haddock protection measure, it remains a significant 'no-take zone' that protects both juvenile and adult haddock.

ANALYSIS

A full assessment of this stock, using the same framework as used in the previous assessment, was conducted by DFO Science in 2002. The assessment concluded that:

- Spawning biomass has steadily increased since the closure of the fishery and is now slightly above the 1970-2001 average.
- Population numbers of haddock have increased substantially but mostly for fish less than 42cm. The abundance of haddock 42cm and larger has remained very low throughout the 1990s.
- The 1998 year-class is above average and the 1999 year-class is exceptional.
- The area occupied by 30+cm haddock declined in the mid-1980s and recently has stabilized near the average of the Research Vessel (RV) time series.
- Poor growth, low condition, maturity at a smaller size and high natural mortality continue to typify the production of this stock.

Bottom temperatures over the past five years have been at or above the 1961-1990 average. Total mortality is calculated to have averaged in excess of 0.35 since the mid-1980s, implying that natural mortality is substantially higher than the 0.2 assumed in previous assessments because fishery removals have been minimal since 1994. Since the mid 1980s the growth rate of ages 3+ fish ranges from 10-30% below the 1970-85 average and has been relatively stable since 1995. This has negatively impacted the rebuilding of the 'fishable' biomass, defined in terms of the current 43cm minimum fish size, which at beginning of year 2001 was in the order of 5,000t, less than one third the 17, 500t 1970-2000 average. By comparison, the 2001 spawning stock biomass was estimated to be 24,600t, slightly higher than the 23,500t average for 1970-2000. With the recruitment of the exceptional 1999 year-class, the 2002 SSB is about 50,000t.

The FRCC conducted public consultations in Yarmouth (November 19), Bedford (November 20) and Port Hawkesbury (November 21), Nova Scotia. Most comments on this stock supported the conclusion that haddock has been more abundant in recent years. There is no apparent difference between the views of industry and the results of the 2002 assessment. Industry representations also included a request to consider a limited reopening of a directed haddock fishery with a 1,000t TAC and a minimum fish size of 38cm. Currently, 38cm haddock in 4TVW are mature and marketable.

In its recommendations for 2002/2003, the Council recommended the establishment of a working group led by DFO Fisheries Management, including DFO Science and industry:

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	15	17	no directed fishery		6.7	6						No directed fishery						
Catch	11.9	16.3	4.2	3.9	9.1	6.8	5.8	5.9	1.2	0.09	0.09	0.10	0.06	0.12	0.05	0.05	0.1	0.07

*Canadian Catch as of Nov. 28/02

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

- to evaluate the impact of reduced growth rate and various harvest strategies on potential short and longer term yields to be derived from the fishery,
- to evaluate potential adjustments to the 43cm minimum fish size in relation to other alternative levels including the 39cm average length for 100% female maturity,
- to design and implement test fishing projects (with appropriate observer coverage),
- to evaluate the ability of industry sectors to minimize cod by-catch while directing towards 43cm/39cm haddock, and to consider other matters as the working group may identify.

The 2002 DFO Science Fisheries Status Report addresses this recommendation and states that:

- Prospects of 4TVW haddock returning to the productivity observed prior to the mid – 1960s or early 1980s is dependent on growth and natural mortality returning to previous values.
- The best supported hypothesis is that the productivity changes observed are compensatory responses to stresses of environmental/ ecological origin.
- Much of the biomass in recent years has consisted of relatively small haddock, due to slow growth of individuals in the population.
- Present potential yield is 500t to 1, 300t depending on size of first capture.
- SSB is currently about 50,000t due to the 1998 and 1999 year-classes, but if the recent low productivity persists, SSB is expected to decline even without fishing.
- Given its severely depressed state, any increase in 4VsW cod mortality as a result of a re-opened haddock fishery is unacceptable on biological grounds.

Recent year-classes of 4TVW haddock are above average (1998) to extraordinary (1999), total biomass and spawning biomass are substantially above average, there are several age classes in the spawning stock, and the resource is widely distributed. However, considering that weights at age remain low and that natural mortality appears to be high, the biomass is expected to decrease even in the absence of fishing.

A re-opened directed fishery for 4TVW haddock could cause conservation problems for 4VsW cod. The status of 4VsW cod is such that, on a biological basis, removals by fishing should be as close to zero as possible. The FRCC notes that in 4VsW, cod are caught in DFO surveys, in Sentinel fisheries and as by-catch of the halibut, pollock, redfish and hake fisheries. The total catches in 2000-2001 were in the order of 150t and 71t had been caught as of October 7th 2002.

Given the potential conservation problems for 4VsW cod, the Council recommends that there be no directed fishery for haddock in 4TVW in 2003/ 2004, subject to initiatives outlined below.

The FRCC recommends that by-catches of haddock in 4TVW should not exceed those required for the normal conduct of fisheries directed towards other species, subject to initiatives outlined below.

The current SSB estimate of 50,000t for 4TVW haddock is one of the highest observed since 1970 with higher values in 1985 to 1987 (59,000t, 65,000t, 53,000t). During 1948 to 1970 however, the SSB was consistently 50,000t or more with the highest SSB estimated at close to 80,000t in 1957-1958. Currently, the SSB is comprised in large part of (mature) fish smaller than the 43cm minimum size; given current growth and natural mortality, few of these fish are expected to grow above 43cm. DFO science believes that there is a high probability that the SSB will decrease to what it considers to be possible conservation limits within a few years if natural mortality remains high, if growth does not improve and if recruitment is average or less.

The FRCC believes that a limited index fishery would enable industry to gain a perspective on the abundance, size composition, distribution, and availability of haddock and other species at different times of the year. As in other index fisheries, the knowledge thus gained by the industry helps the FRCC obtain a better perspective on the status of resources in the area.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	15	17	no directed fishery		6.7	6						No directed fishery						
Catch	11.9	16.3	4.2	3.9	9.1	6.8	5.8	5.9	1.2	0.09	0.09	0.10	0.06	0.12	0.08	0.08	0.1	0.07

*Canadian Catch as of Nov. 28/02

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

- to evaluate the impact of reduced growth rate and various harvest strategies on potential short and longer term yields to be derived from the fishery,
- to evaluate potential adjustments to the 43cm minimum fish size in relation to other alternative levels including the 39cm average length for 100% female maturity,
- to design and implement test fishing projects (with appropriate observer coverage),
- to evaluate the ability of industry sectors to minimize cod by-catch while directing towards 43cm/39cm haddock, and to consider other matters as the working group may identify.

The 2002 DFO Science Fisheries Status Report addresses this recommendation and states that:

- Prospects of 4TVW haddock returning to the productivity observed prior to the mid – 1960s or early 1980s is dependent on growth and natural mortality returning to previous values.
- The best supported hypothesis is that the productivity changes observed are compensatory responses to stresses of environmental/ ecological origin.
- Much of the biomass in recent years has consisted of relatively small haddock, due to slow growth of individuals in the population.
- Present potential yield is 500t to 1, 300t depending on size of first capture.
- SSB is currently about 50,000t due to the 1998 and 1999 year-classes, but if the recent low productivity persists, SSB is expected to decline even without fishing.
- Given its severely depressed state, any increase in 4VsW cod mortality as a result of a re-opened haddock fishery is unacceptable on biological grounds.

Recent year-classes of 4TVW haddock are above average (1998) to extraordinary (1999), total biomass and spawning biomass are substantially above average, there are several age classes in the spawning stock, and the resource is widely distributed. However, considering that weights at age remain low and that natural mortality appears to be high, the biomass is expected to decrease even in the absence of fishing.

A re-opened directed fishery for 4TVW haddock could cause conservation problems for 4VsW cod. The status of 4VsW cod is such that, on a biological basis, removals by fishing should be as close to zero as possible. The FRCC notes that in 4VsW, cod are caught in DFO surveys, in Sentinel fisheries and as by-catch of the halibut, pollock, redfish and hake fisheries. The total catches in 2000-2001 were in the order of 150t and 71t had been caught as of October 7th 2002.

Given the potential conservation problems for 4VsW cod, the Council recommends that there be no directed fishery for haddock in 4TVW in 2003/ 2004, subject to initiatives outlined below.

The FRCC recommends that by-catches of haddock in 4TVW should not exceed those required for the normal conduct of fisheries directed towards other species, subject to initiatives outlined below.

The current SSB estimate of 50,000t for 4TVW haddock is one of the highest observed since 1970 with higher values in 1985 to 1987 (59,000t, 65,000t, 53,000t). During 1948 to 1970 however, the SSB was consistently 50,000t or more with the highest SSB estimated at close to 80,000t in 1957-1958. Currently, the SSB is comprised in large part of (mature) fish smaller than the 43cm minimum size; given current growth and natural mortality, few of these fish are expected to grow above 43cm. DFO science believes that there is a high probability that the SSB will decrease to what it considers to be possible conservation limits within a few years if natural mortality remains high, if growth does not improve and if recruitment is average or less.

The FRCC believes that a limited index fishery would enable industry to gain a perspective on the abundance, size composition, distribution, and availability of haddock and other species at different times of the year. As in other index fisheries, the knowledge thus gained by the industry helps the FRCC obtain a better perspective on the status of resources in the area.

The FRCC recommends that the working group created by DFO Fisheries Management, including DFO Science and industry that operated in 2002 continue its work in 2003:

- **to design and implement test fishing projects (with appropriate observer coverage), in order to evaluate the ability of industry sectors to minimize cod by-catch while directing towards 43cm/38cm haddock, and to consider other matters as the working group may identify.**

A large closed area covering much of Emerald and Western Banks (i.e. the Haddock Box) is a significant feature of this stock and its habitat. This closed area was implemented in 1993 to encompass what were considered to be major juvenile haddock areas. While the boundary of the area has been debated in relation to its effectiveness as a juvenile haddock protection measure, it remains a significant 'no-take zone' that protects both juvenile and adult haddock.

- **DFO and industry studies suggest that the higher concentration of small haddock do not correspond to the current boundaries of the Haddock Box. The Council recommends that the boundaries of the area closed to fishing to protect juvenile haddock be revised, taking into account potential conservation considerations for all fishery resources in the area.**

Sources

DFO Science

SSR A3-35 (2001) Eastern Scotian Shelf Haddock (Div.4TVW)
CSAS Research Document 2001/100: Assessment of the Status of Div. 4TVW Haddock: 2000
Biological considerations for the re-opening of the Eastern Scotian Shelf (4TVW) Haddock Fishery. DFO Science Fisheries Status Report 2002/ DRAFT

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

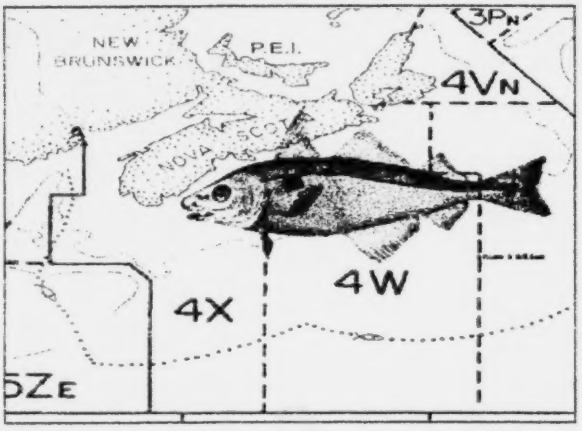
Written Briefs

National Sea Products – Michael O'Connor (2002-010-00200)
Scotia Fundy Mobile Gear Fishermen's Association (2002-010-00210)
Groundfish Enterprise Allocation Council – Bruce Chapman (2002-010-00216)
Eastern Nova Scotia 4VsW Management Board (2002-010-00183)
National Sea Products – Michael O'Connor (2002-010-00209)

Council's Views on Stock Status

Overall Stock Indicators:	very strong rebuilding pulse; growth rate remain low and natural mortality appears to be high
	Compared to average
Overall Abundance (age 2+):	highest in time series; over double the 1970-2000 average
Spawning Biomass:	healthy; probably above 1948-2000 average
Recruitment:	good (1998) to extraordinarily good (1999).
Age Structure:	3+ biomass reasonably spread over 5 year-classes; opportunity for large and sustained increase in SSB to flow from good 1998 year-class and extraordinary 1999 year-class
Growth Rate:	low, particularly for older fish, age 3+ fish in range of 10-30% below 1970-85 average; relatively stable since 1995
Condition: (length to weight ratio)	below 1979-99 average but within 5% (30cm) and 10% (45cm) of average.
Distribution:	stable or above the 1970-2000 average; stable or declining since the mid 1980s
Recent Exploitation rate:	very low at 0.003

HADDOCK - 4X5Y



PERSPECTIVE

Haddock is a bottom dwelling species that feeds mainly on small invertebrates. Haddock grow rapidly at young ages reaching an average length of 43cm and average weight of 0.8kg by age 3, the age of 50% female maturity. The fecundity of females at first maturity is low then increases dramatically with age. The major spawning area for the stock is on Browns Bank where peak spawning may occur between April and June. After age 3, growth rate slows with haddock reaching an average of 66cm in length by age 10.

Reported haddock landings since 1988 have been below 11,000t annually. Historically, this fishery has been dominated by mobile gear (trawlers) except during 1990-93 when the proportion of landings taken by fixed gear (longline and handline) was greater. Quotas for this stock were introduced in 1970 and the Browns Bank spawning closure has been in effect every year since that time with variations in the dates. The current dates of the closure are from February 1 to June 15.

Smaller handline vessels fish primarily May to September. The ITQ fleet (MG<65') adapts its fishing strategy to available quotas and is now more seasonal in fishing pattern depending on quota availability and market. The small fixed gear fleets fish primarily in June and July with more large vessel (>65' LOA) and ITQ participation during the fall period.

INTERIM STOCK OBJECTIVES

The Council has made recommendations for 4X5Y haddock based on the following objectives and conservation measures for 4X5Y haddock. In consultation with the fishing industry, the Council developed a long-term Fisheries Resource Conservation Plan (FRCP) for 4X5Y cod and haddock. The objectives of the plan are:

1) Conservation and Rebuilding of Commercial Groundfish Stocks

a) **Ecosystem Health**. To prevent or to mitigate human disturbances of species diversity, genetic variability, ecosystem productivity, structure, and function, and marine environmental quality of target and non-target species

b) **Rebuild**. To rebuild the spawning stock biomass (ages 4+) to the target range

c) **Conserve**. To identify, monitor, and avoid over-exploitation of individual spawning stock components and juvenile rearing areas within the management area

d) **Research**. To investigate, monitor and establish strategies regarding the reproductive capacity of the stock, substock components, and interactions with other species in the ecosystem

2) Sustainable Utilization and Relative Stability in the Fishery and Management Regime

a) **Sustainable use**. To conserve the ecosystem functions for the use of future generations

b) **Long-term view**. To adopt a longer-term view of stock management linked to spawning stock biomass levels and other indicators associated with the health of the stock

c) **Affirm Fluctuations**. To acknowledge that conservation decisions relate to stocks that are subject to natural fluctuations within a dynamic and complex eco-system

The FRCC and fishermen in 4X5Y are continuing their work toward applying these objectives in the mixed cod and haddock fisheries in 4X5Y.

ANALYSIS

There was a full assessment of this stock in 2002. The 2002 Stock Status Report indicates:

- The quota for 4X5Y haddock has remained at 8,100t for the last 5 years. Reported landings have been close to the quota each year.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	15	15	15	12.4	4.6	4.6	0	0	6	4.5	6	6.5	6.7	8.1	8.1	8.1	8.1	8.1
Catch	15.3	15.3	13.7	11	6.9	7.4	10	10.2	6.6	4.41	5.67	6.19	6.50	7.88	9.11	7.90	7.6	5.1

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

- Exploitation rate for ages 5-7 decreased from approximately 50% in the early 1980s and dropped below $F_{0.1}$ from 1994 through 1997. The exploitation rate in 2002/2003 will be near 20% if the TAC is not exceeded.
- Estimates of the projected yields at $F_{0.1}$ in the year 2002/2003 range widely depending upon how the fishery responds to these year-classes.
- The 1998 year-classs is estimated to be the largest observed in almost 40 years, and the 1999 year-class is estimated to be the second largest. These yearclasses will result in a doubling of spawning stock biomass.

At consultations, fishermen from both fixed and mobile gear sectors stated that they have made significant progress in directing for haddock with minimal by-catch of cod in what was previously predominantly a mixed cod-haddock fishery. The FRCC recognizes the effort made by industry to conduct a clean haddock fishery and encourages continued innovation in the harvesting of this resource in a responsible manner. Fishermen requested that the 4X5Y haddock stock is a "good news" story, fully rebuilt and that increases in the TAC in the range of 3,000t to 3,500t is warranted.

The Stock Status Report (SSR) indicates that the average 1997 yearclass and the large 1998 yearclass are estimated to increase spawning stock biomass (4+ Biomass) from approximately 40,000t to greater than 60,000t in 2002. above the stock rebuilding target of >55,000t 4+ biomass as identified in the Fisheries Resource Conservation Plan, the Council considers the "Stock Condition" to be healthy and in a fully rebuilt condition.

The "Productivity Regime" is determined by the totality of the environmental factors as well as the biological factors. The only environmental indicator received at RAP was that the near bottom water temperatures in the Western Scotian Slope ranged from 0.4-2.0 degrees Celsius above normal. As for the biological indicators, we were unable to receive the long-term decadal averages, however, recent recruitment has been the strong, with the 1997 yearclass average, 1998 yearclass strongest since 1970, 1999 and 2000 yearclasses are strong and above average respectively. The mean lengths-at-age in the summer research vessel survey have been decreasing since the early 1990's, particularly at older ages. Mean weight-at-age show similar trends. The growth rate calculated for length at ages 2-7 shows a long-term decreasing trend since the mid-1970's but shows some signs of stabilizing in the last few years. The fish condition has shown decreasing trend since the early 1980's and reached a minimum in 2002. The geographic distribution indicates local density and area occupied has shown an increasing trend since the late 1980's and is near high levels seen in the late 1970's and early 1980's. The Council considers the "Productivity Regime" as being intermediate. The rationale is that the individual fish condition factors: ie. Growth, Fulton's K, weight-at-age, lengths-at-age, are decreasing or low while the recruitment and abundance indicators are increasing and high. Without considering the fish condition factors, the productivity would be "high".

The FRCC recommends that for 4X5Y haddock; since the "Stock Condition" is currently considered healthy and the "Productivity Regime" is currently considered intermediate, that the TAC may be increased to 10,000t for the next two fishing seasons (2003-2005).

Improved recruitment and low exploitation in the early 1990's started stock rebuilding. Recent exceptional recruitment and continued low exploitation brought the stock to its current healthy condition and should continue to rebuild ensuring stability for the medium term. Also, the age structure has been broadening since 1995, indicating that the current population abundance consists of several ages with above average strength. This stock is presently considered healthy and will likely fluctuate due to varying recruitment pulses in the longer term.

The Council recognizes that the recommended increase in haddock TAC while not recommending increases in the cod will place the fishermen in a more compromising position with respect to potential high by-catches in a mixed fishery. With the projected increase in fishable biomass from 40,000t to >60,000t in 2003, the Council is confident that it is an acceptable risk. More effort will be required by fishermen to direct for haddock by targeting specific areas and times to fish, or other innovative ideas in gear technology that will accomplish the same end. DFO will have to be diligent in enforcement and protection to ensure compliance.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
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The FRCC recommends that DFO closely monitor the fishery and ensure compliance in the mixed cod and haddock fishery.

Historical biases in estimating variable recruitment and the concentration of the fishery on few year classes require ongoing caution in to maintain a sustainable fishery. The FRCC encourages ongoing strong enforcement policies in the management of the mixed cod and haddock fishery to avoid resource wastage.

The FRCC recommends that management measures be enforced to protect juvenile haddock and incoming recruitment and efforts to avoid the capture of small fish be continued.

Sources

DFO Science

SSR A3-07 (2002) Southern Scotian Shelf and Bay of Fundy Haddock
SSR A3-35 (2001) Updates on Selected Scotian Shelf Groundfish Stocks in 2001

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

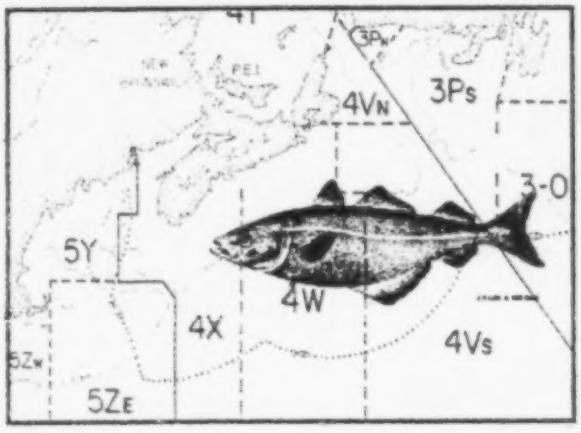
Written Briefs

Yarmouth County Fixed Gear Association – C. Davis & L. Blackler (2002-010-00178)
Nova Scotia Fish Packers Association – Denny Morrow (2002-010-00204)
Inshore Fisheries Limited – Claude d'Entremont (2002-010-00205)
Charlesville Fisheries Ltd. – Raymond Belliveau (2002-010-00206)
Scotia Fundy Inshore Fishermen's Association – E.L. Walters (2002-010-00207)
Scotia Fundy Mobile Gear Fishermen's Association (2002-010-00210)
National Sea Products – Michael O'Connor (2002-010-00209)
Shelburne County Competitive Fishermen's Association – P. Decker & V. Wolfe (2002-010-00187)

Council's Views on Stock Status

Overall Stock Indicator:	rebuilt to long-term average
	Compared to average
Spawning Biomass:	above average since the mid 1980s nearly as high seen since 1970
Total Biomass	above average since the mid 1980s nearly as high seen since 1970
Recruitment:	year classes 1993/ 1994 above average; 1997 average, 1998 strongest in time series (since 1970), 1999 strong, and 2000 above average
Growth and Condition	growth rate decreased since 1970 and stabilizing, fish condition decreasing trend since 1980 reaching minimum in 2002
Age structure:	broadening since 1995, indicating that the current population abundance consists of several ages with above average strength
Distribution:	increasing trends of both area occupied and local density
Recent Exploitation Level:	at or below 20% since 1994

POLLOCK - 4VWX5ZC



PERSPECTIVE

Atlantic pollock range from southern Labrador to Cape Hatteras. They are semi-pelagic, schooling and tend to aggregate by size group. Young pollock are associated with inshore habitats and recruit to offshore areas as two year olds. Pollock mature at ages 3-5 and show marked differences in growth rate by area. Food of adult pollock includes euphausids, herring, sand lance and silver hake. Pollock are fished with fixed gear long lines and gill nets as well as mobile otter trawls. They are often taken as a by-catch in small mesh fisheries (redfish).

Landings averaged 40,000t from 1980-1989, dropped to 24,000t from 1990-1996, and then dropped to approximately 5,000t in recent years. TAC levels established in the early 1970's, which have also gradually declined from 40,000t to 10,000t have rarely been caught.

ANALYSIS

The most recent full assessment was conducted in 1999, the 2001 and 2002 Groundfish Updates provided by DFO Science state:

- Catch rates in the standardized catch rate series have risen sharply in 2002 after low levels in 1999 - 2001. The catch was dominated by age 4 and 5 fish (1998 and 1997 year-classes).This may indicate increased abundance but may also indicate increased availability to fishing gear that varies year to year.
- The 1997 year-class is moderately strong and recruiting to the fishery. The 1998 and 1999 year-classes appear to be above the recent average.
- The 2001 ITQ survey caught large numbers of age two fish (1999 year-class) compared with the 10-year average, but they did not track through in the 2002 survey.
- The survey continued to show few fish larger than 70cm compared to 1995 - 1998 and the fishery remains spatially restricted toward the west.
- Small fish ages two & three remain abundant as indicated by the RV survey.
- Catches up to the current TAC level of 10,000t will likely permit rebuilding of the resource.

The FRCC held public consultations on this stock in Yarmouth, Bedford and Port Hawkesbury in November 2002. Industry comments were in very strong support of either a status quo of 10,000t or an increase to a 12,000t TAC.

Landings in the mobile fleet sector have been low the past few years resulting in the overall TAC not being caught. Fishermen in the western areas generally reported increased abundance of pollock in traditional areas, more size ranges and better landings overall although fishing was reported to be poorer in certain areas.

It was noted by industry that overall, pollock landings improved somewhat in 2001/2002 compared to recent years. There have been improvements in market conditions and catch availability resulting in some groups running out of quota in 2002. There were continued general observations of small pollock being numerous in inshore waters as well as reports of increased presence of pollock on Scotian Shelf, Georges Bank, and Crowell Basin in other directed fisheries.

Industry agrees that the overall condition of the stock is improving but remains poor compared to the past. There are continued positive signs of recruitment, stock assessments are considered to be highly uncertain. Fishing effort has remained low.

Increasing by-catch of recruiting pollock in the redfish fishery is consistent with the expected improved incoming recruitment. However, concerns continue and are increasing regarding the potential of small mesh

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	42.4	40	43	43	43	38	43	43	21	24	14.5	10	15	20	12	10	10	10
Catch	43.8	44.3	46	42.9	43.7	37.9	38.5	33.7	20.8	16.3	9.8	9.2	11.9	14.4	8.8	5.8	6.3	5.9

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

mobile redfish fishing activities in western areas to deplete incoming strong year-classes through excessive by-catch of these smaller pollock.

Landings were still significantly under the TAC due to a number of ongoing factors affecting the pollock fishery. These include the lack of any pollock fishing effort by some quota holders in the mobile sector, pollock fishing grounds being closed to directed groundfish fishing in 4VW, fisheries management involving closed areas and fleet sector allocations and harvesting strategies.

There are also constraints placed on pollock fishing by restrictive hake and cod by-catch levels. Hake are said to be increasing in abundance, particularly in western fishing areas of 4X and 5Y and by-catches of white hake have continued to rise in 2002. It was also stated that many traditional pollock fishers are now primarily involved in the snow crab or herring roe fishery.

Following on FRCC recommendations to develop alternative methods for estimating stock abundance, a DFO /industry acoustics study commenced in 1999 and was completed in 2002. The study has revealed important information on how these methods could be applied to better measure pollock biomass by considering specific temporal, spatial and geographical approaches in vessel surveys, customized to well known pollock distribution and behavior. However, it is obvious that further work is required to advance this methodology to a point where the data could be applied to current assessment methods. As well, issues related to confounding factors such as species mixing, adequate survey coverage and lack of multi-boat comparisons during hydro-acoustic measurements could pose serious problems.

The ongoing substantial uncertainties of existing assessment methods, and the commercial importance of this species, render ongoing improved information regarding abundance of pollock critical. In light of the potential importance of this new method in determining abundance, it is imperative that additional work be conducted to advance and expand on the available information base to develop alternative indices of abundance. Combining new or existing sources of information in conjunction with hydro - acoustic information methodology for assessment purposes may improve the pollock knowledge base. Efforts to examine all possible sources of data such as the Research Vessel (RV) survey, ITQ survey, tagging etc., in conjunction with hydro-acoustics may yield valuable information. Therefore,

The FRCC recommends DFO continue to support additional acoustic studies as a method for estimating pollock abundance. In addition, a review to evaluate any other existing and appropriate sources of information in combination with hydro - acoustics to further improve the pollock assessment should be undertaken.

Lack of confidence in the reliability of the assessment of this stock is a continuing problem. Among other things marked differences in the assessment formulations such as inter-annual variations of year-class estimates do not provide a consistent year-over-year perspective on stock status. Therefore, there continues to be a large degree of uncertainty about abundance of this stock.

TACs established through the years 1991 through 1998 averaged 20,000t. The lowest TAC in this time series was 10,000t (1996). Setting the TAC equal to the lowest level of the past 10 years is indicative of severe uncertainties in estimating stock status, shifts in stock distribution and absence of older and larger fish.

Information made available to the Council in 2002 indicates a slight to moderately positive overall change in the condition of the stock. Given there are strong positive signs involving continued recruitment in multiple year-classes as well as increased commercial catch availability in the fishery, the Council considers a status quo TAC level presents low risk to the stock and provides a high potential for rebuilding.

Industry has suggested status quo or an increase to 12,000t as a safe TAC level. However, the Council believes the uncertainties of the assessment, lack of large fish in the population and restricted geographical range warrant continued caution, and that any consideration of a TAC increase beyond the present levels should be undertaken in the context of long term planning.

The FRCC recommends that the TAC for 2003/2004 for 4VWX5Zc pollock be set at 10,000t.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	42.4	40	43	43	43	38	43	43	21	24	14.5	10	15	20	12	10	10	10
Catch	43.8	44.3	46	42.9	43.7	37.9	38.5	33.7	20.8	15.3	9.8	9.2	11.9	14.4	8.8	5.5	6.3	5.9

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

mobile redfish fishing activities in western areas to deplete incoming strong year-classes through excessive by-catch of these smaller pollock.

Landings were still significantly under the TAC due to a number of ongoing factors affecting the pollock fishery. These include the lack of any pollock fishing effort by some quota holders in the mobile sector, pollock fishing grounds being closed to directed groundfish fishing in 4VW, fisheries management involving closed areas and fleet sector allocations and harvesting strategies.

There are also constraints placed on pollock fishing by restrictive hake and cod by-catch levels. Hake are said to be increasing in abundance, particularly in western fishing areas of 4X and 5Y and by-catches of white hake have continued to rise in 2002. It was also stated that many traditional pollock fishers are now primarily involved in the snow crab or herring roe fishery.

Following on FRCC recommendations to develop alternative methods for estimating stock abundance, a DFO /industry acoustics study commenced in 1999 and was completed in 2002. The study has revealed important information on how these methods could be applied to better measure pollock biomass by considering specific temporal, spatial and geographical approaches in vessel surveys, customized to well known pollock distribution and behavior. However, it is obvious that further work is required to advance this methodology to a point where the data could be applied to current assessment methods. As well, issues related to confounding factors such as species mixing, adequate survey coverage and lack of multi-boat comparisons during hydro-acoustic measurements could pose serious problems.

The ongoing substantial uncertainties of existing assessment methods, and the commercial importance of this species, render ongoing improved information regarding abundance of pollock critical. In light of the potential importance of this new method in determining abundance, it is imperative that additional work be conducted to advance and expand on the available information base to develop alternative indices of abundance. Combining new or existing sources of information in conjunction with hydro - acoustic information methodology for assessment purposes may improve the pollock knowledge base. Efforts to examine all possible sources of data such as the Research Vessel (RV) survey, ITQ survey, tagging etc. in conjunction with hydro-acoustics may yield valuable information. Therefore,

The FRCC recommends DFO continue to support additional acoustic studies as a method for estimating pollock abundance. In addition, a review to evaluate any other existing and appropriate sources of information in combination with hydro - acoustics to further improve the pollock assessment should be undertaken.

Lack of confidence in the reliability of the assessment of this stock is a continuing problem. Among other things marked differences in the assessment formulations such as inter-annual variations of year-class estimates do not provide a consistent year-over-year perspective on stock status. Therefore, there continues to be a large degree of uncertainty about abundance of this stock.

TACs established through the years 1991 through 1998 averaged 20,000t. The lowest TAC in this time series was 10,000t (1996). Setting the TAC equal to the lowest level of the past 10 years is indicative of severe uncertainties in estimating stock status, shifts in stock distribution and absence of older and larger fish.

Information made available to the Council in 2002 indicates a slight to moderately positive overall change in the condition of the stock. Given there are strong positive signs involving continued recruitment in multiple year-classes as well as increased commercial catch availability in the fishery, the Council considers a status quo TAC level presents low risk to the stock and provides a high potential for rebuilding.

Industry has suggested status quo or an increase to 12,000t as a safe TAC level. However, the Council believes the uncertainties of the assessment, lack of large fish in the population and restricted geographical range warrant continued caution, and that any consideration of a TAC increase beyond the present levels should be undertaken in the context of long term planning.

The FRCC recommends that the TAC for 2003/2004 for 4VWX5Zc pollock be set at 10,000t.

There are promising signs of improvement in this stock. Uncertainties associated with the overall abundance, distribution and condition of the stock suggests that measures be continued to avoid having a disproportionate amount of the catch coming from a small area rather than being spread throughout the management area.

The FRCC recommends that DFO continue to report on pollock catch levels by Subarea.

The FRCC further recommends that DFO and industry should ensure that effort is not disproportionately directed towards any one Subdivision of the management unit.

The strong 1997 year-class is recruiting to the fishery. The 1998 year-class also appears moderately strong. The 1999 year-class is also apparent in the survey. Due to the condition and lack of mature spawning fish in the population, these incoming year-classes continue to represent the greatest potential for rebuilding the pollock stock. Effective management measures must be considered to protect these year-classes until they have the opportunity to make a significant contribution to the spawning stock biomass and to broaden the age structure of this stock. By-catch of small pollock in the redfish fishery appears to remain a problem in 2002.

It is critical that DFO address this issue that was identified in 2001 to ensure the incoming recruitment is not subject to excessive exploitation.

The FRCC recommends that Fisheries Management and industry develop and implement an action plan to ensure that 2003 /2004 fishing effort on the 1997 and incoming 1998 and 1999 year-classes remain conservative enough to allow rebuilding of this stock.

The FRCC recommends that Fisheries Management in conjunction with industry identify probable areas of high concentrations of small pollock and implement temporary closures to directed pollock fishing, and that excessive amounts of small pollock are not harvested through other fisheries, particularly the small mesh redfish fishery.

Sources

DFO Science

SSR A3-13 (1999) Pollock in Div. 4VWX & Subarea 5
SSR A3-35 (2002) Updates on selected Scotian Shelf groundfish stocks in 2002

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

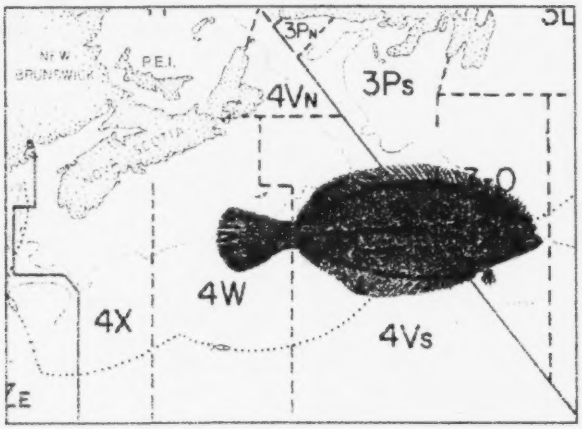
Written Briefs

Eastern Nova Scotia 4VsW Management Board (2002-010-00183)
Shelburne County Competitive Fishermen's Association – P. Decker & V. Wolfe (2002-010-00187)
Inshore Fisheries Limited – Claude d'Entremont (2002-010-00205)
Charlesville Fisheries Ltd. – Raymond Belliveau (2002-010-00206)
Scotia Fundy Inshore Fishermen's Association – E.L. Walters (2002-010-00207)
Scotia Fundy Mobile Gear Fishermen's Association (2002-010-00210)

Council's Views on Stock Status

Overall Stock Indicator:	likely below average, but improving
	Compared to average
Spawning Biomass:	uncertain / below average
Total Biomass:	uncertain / below average
Recruitment:	1992-1995 year-classes below average; 1997 year-class is strong, 1998 and 1999 year-classes appear strong.
Growth and Condition:	slight decline in weights at age reported in 1999
Age Structure:	size and age of fish diminishing reported in 1999
Distribution:	increasingly constricted reported in 1999, may now be expanding
Recent Exploitation Level:	unknown but may be decreasing

FLATFISHES - 4VW



PERSPECTIVE

Flatfish are bottom dwelling fishes primarily associated with mud and sand bottom. They are unique among other fish in being asymmetrical, both eyes lying on one side of a highly flattened body. Early in life they start swimming on one side, and the eye on the underside migrates to the upper side. Flatfish lie on the bottom on their blind side. Their principal food items include crustaceans, molluscs, polychaete worms and small fishes.

There is much localized variation in species mix associated with depth and temperature. Although the winter flounder, American plaice, and yellowtail flounder populations on the Scotian Shelf have been divided into 4VW and 4X5Y management units, the biological basis for that separation has yet to be established.

American plaice: The Spring, Summer and Fall Research Vessel (RV) surveys (1978-84) indicate that the major concentration of this species occurs in 4VW throughout the year, with a continuous distribution over the Scotian Shelf. The distribution of pre-recruits (<31cm) fish during the Summer RV surveys, (1993-97) suggests distribution in both 4X and 4W; larger fish are not abundant in 4X, particularly in the Bay of Fundy. Concentrations occur in the deeper water just inshore of Browns Bank. This distribution is also indicated by the iTQ survey that caught very few plaice in the Bay of Fundy, but consistently caught them inshore of Browns Bank, and in lesser numbers, up to the 4X-4W boundary. American plaice is a deeper water species than winter flounder or yellowtail flounder, and is seldom caught in shallow water stations of the RV or individual transferable quota (ITQ) surveys.

Yellowtail flounder: The Spring, Summer and Fall RV surveys indicate the major concentration of this species occurs in 4VW throughout the year, with minor concentrations in the areas of Browns Bank and the Bay of Fundy. All three surveys indicate some differences between the distribution in 4VW and 4X5Y, as well as between Browns Bank and the Bay of Fundy. The Summer RV surveys (1993-97) indicate similar distributions of juvenile and adult fish.

The current mesh size regulation for directing for 4VW flatfish is 155mm square. The 155mm square mesh is an increase from previous years and was implemented in part to try to ensure that the proportion of witch flounder in the catch of flatfish did not exceed current levels and in order to protect incoming recruitment.

ANALYSIS

The 2002 stock assessment produced a separate Stock Status Report (SSR) for American plaice and yellowtail flounder on the Eastern Scotian Shelf (Div. 4VW).

The 2002 SSR indicated that for 4VW American plaice:

- Total abundance has been relatively stable since 1994 at about two-thirds of the levels experienced in the 1970-85 period.
- Most of the decline in abundance has been with fishery-sized components of the population which is in the range of one-third that of the 1970-85 period.
- The area occupied by fishery-sized American plaice has declined steadily over the past three decades, with a sharp decline in 2001 and 2002.
- There is no clear trend in the weight to length ratio of pre-recruits, but the weight of fishery-sized fish has declined in the order of 10% since the early 1990's.
- Total mortality and fishing mortality seem to have been increasing throughout the 1990's.

The 2002 SSK indicated that for 4VW yellowtail flounder:

- Total abundance decreased through much of the 1990's and is about two-thirds of the levels experienced in the period 1970-90.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC										5.5	4,125	3.5	3	3	3	3	3	2
Catch	7.7	7.4	8.9	7.3	7.7	7.2	5.8	5.9	4.2	3.6	2.3	2	2	1.90	2.09	0.91	0.75	0.8

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

- Most of the decline in abundance has been with fishery-sized components of the population that is less than one-third of that of the 1970-85 period.
- Pre-recruit abundance has been improving, but with no evidence of a contribution to the fishable biomass.
- The weight to length ratio has increased since the mid-1990s and is approaching levels of the early-mid 1970's.
- There has been virtually no catch of this stock since the mid-1990's and virtually zero fishing mortality.
- Last year it was reported that the abundance of winter flounder in 4VW remains relatively high and it is not fished commercially. There was no update provided for this stock in 2002.

The information in the 2002 SSR shows continuing indications of stock decline for the fishable biomass of both American plaice and yellowtail flounder. While fishing mortality may be a factor in the decline of American plaice, it is not a factor affecting yellowtail flounder at this point.

There was very little discussion on these stocks during consultations. It was noted by an industry representative that the availability of commercial-size American plaice and yellowtail flounder continues to decline. There was some question whether the slow growth rates of yellowtail would ever permit resumption of a commercially viable catch rate. Fishermen also observed that when seismic exploration for oil and gas took place while they were fishing, bottom dwelling species, such as flatfish, appeared to leave the area only to return days or weeks later. The same seismic disturbances were experienced in the early 1980s.

Last year the Council recommended a reduction in the flatfish TAC from 3,000t to 2,000t, primarily due to the concern for the continuing decline observed in American plaice and yellowtail flounder stocks. Also, it was and it continues to be apparent that a proportion of landings continues to be recorded as "unspecified flatfish". The Council observes that American plaice may not begin to rebuild under existing total mortality levels, and that yellowtail flounder is not in a condition to withstand any redirection of fishing effort if this was to occur within the framework of a 'mixed species TAC'. In the Council's view, the time may have come to cease directed fishing activity towards both of these stocks until there is a satisfactory increase in the abundance of older fish in their respective population. However, before making a final determination and recommendation in this direction, the Council feels compelled to engage Fisheries Science and the industry in a focused discussion on a number of key issues.

The FRCC recommends that a working group process led by Fisheries Management and involving industry and Fisheries Science be initiated to consider and report, by September 2003, on various matters including:

- Effectiveness of the RV survey and other potential instruments/techniques as an indicator of abundance for larger-size American plaice throughout the Scotian Shelf.
- Productivity factors (environmental and biological) affecting the conservation and rebuilding of American plaice and yellowtail stocks in 4VW, with associated harvest yields that may be expected to be realized in the short-to-medium term.
- Longer-term indicators and associated reference points, and their relationship to harvest decisions.
- Longer-term approach to targeting conservation measures towards individual species.
- Other issues that the working group may deem appropriate.

The Council intends to utilize the aforementioned report to develop longer-term conservation plans for American plaice and yellowtail flounder in 4VW.

Elsewhere in this report, the Council made a recommendation to establish a separate witch flounder quota on a pilot basis for 2003-2004. A 600t TAC was recommended for witch across 4VWX. The Council notes that approximately 250t of witch flounder has been part of the annual catch in 4VW in recent years. By removing this amount from the 2002-2003 quota of 2,000t, a status quo TAC for the remaining flatfish species in 4VW would be 1,750t.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC										5.5	4.125	3.5	3	3	3	3	3	2
Catch	7.7	7.4	8.9	7.3	7.7	7.2	5.8	5.3	4.2	3.5	2.3	2	2	1.90	2.03	0.91	0.73	0.6

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

- Most of the decline in abundance has been with fishery-sized components of the population that is less than one-third of that of the 1970-85 period.
- Pre-recruit abundance has been improving, but with no evidence of a contribution to the fishable biomass.
- The weight to length ratio has increased since the mid-1990s and is approaching levels of the early-mid 1970's.
- There has been virtually no catch of this stock since the mid-1990's and virtually zero fishing mortality.
- Last year it was reported that the abundance of winter flounder in 4VW remains relatively high and it is not fished commercially. There was no update provided for this stock in 2002.

The information in the 2002 SSR shows continuing indications of stock decline for the fishable biomass of both American plaice and yellowtail flounder. While fishing mortality may be a factor in the decline of American plaice, it is not a factor affecting yellowtail flounder at this point.

There was very little discussion on these stocks during consultations. It was noted by an industry representative that the availability of commercial-size American plaice and yellowtail flounder continues to decline. There was some question whether the slow growth rates of yellowtail would ever permit resumption of a commercially viable catch rate. Fishermen also observed that when seismic exploration for oil and gas took place while they were fishing, bottom dwelling species, such as flatfish, appeared to leave the area only to return days or weeks later. The same seismic disturbances were experienced in the early 1980s.

Last year the Council recommended a reduction in the flatfish TAC from 3,000t to 2,000t, primarily due to the concern for the continuing decline observed in American plaice and yellowtail flounder stocks. Also, it was and it continues to be apparent that a proportion of landings continues to be recorded as "unspecified flatfish". The Council observes that American plaice may not begin to rebuild under existing total mortality levels, and that yellowtail flounder is not in a condition to withstand any redirection of fishing effort if this was to occur within the framework of a 'mixed species TAC'. In the Council's view, the time may have come to cease directed fishing activity towards both of these stocks until there is a satisfactory increase in the abundance of older fish in their respective population. However, before making a final determination and recommendation in this direction, the Council feels compelled to engage Fisheries Science and the industry in a focused discussion on a number of key issues.

The FRCC recommends that a working group process led by Fisheries Management and involving industry and Fisheries Science be initiated to consider and report, by September 2003, on various matters including:

- Effectiveness of the RV survey and other potential instruments/techniques as an indicator of abundance for larger-size American plaice throughout the Scotian Shelf.
- Productivity factors (environmental and biological) affecting the conservation and rebuilding of American plaice and yellowtail stocks in 4VW, with associated harvest yields that may be expected to be realized in the short-to-medium term.
- Longer-term indicators and associated reference points, and their relationship to harvest decisions.
- Longer-term approach to targeting conservation measures towards individual species.
- Other issues that the working group may deem appropriate.

The Council intends to utilize the aforementioned report to develop longer-term conservation plans for American plaice and yellowtail flounder in 4VW.

Elsewhere in this report, the Council made a recommendation to establish a separate witch flounder quota on a pilot basis for 2003-2004. A 600t TAC was recommended for witch across 4VWX. The Council notes that approximately 250t of witch flounder has been part of the annual catch in 4VW in recent years. By removing this amount from the 2002-2003 quota of 2,000t, a status quo TAC for the remaining flatfish species in 4VW would be 1,750t.

For 2003/2004, and pending the outcome of the working group process recommended above, the FRCC recommends that the TAC for 2003/2004 flatfish be established at the level of 1,750t.

In its recent reports, the Council has stressed the importance of identifying all flatfish landings by individual species.

The FRCC recommends DFO require as a condition of licence that 100% of catches of 4VW flatfish be recorded by species commencing in 2003/2004.

Sources

DFO Science

SSR A3-19 (1997) Witch Flounder in Division 4VWX
SSR A3-34 (2000) American Plaice and Yellowtail Flounder on the Eastern Scotian Shelf (Div. 4VW)
SSR A3-35 (2001) Updates on selected Scotian Shelf groundfish stocks in 2001
SSR A3-35 (2002) Updates on selected Scotian Shelf groundfish stocks in 2002
SSR A3-34 (2002) American Plaice and Yellowtail Flounder on the Eastern Scotian Shelf (Div. 4VW)

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

Written Briefs

Richard Gerrow - Fisherman (2002-010-00203)
Inshore Fisheries Limited – Claude d'Entremont (2002-010-00205)
Scotia Fundy Mobile Gear Fishermen's Association (2002-010-00210)
Charlesville Fisheries Ltd. – Raymond Belliveau (2002-010-00206)

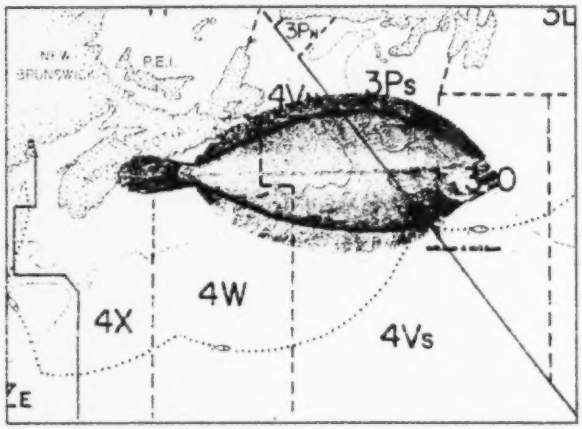
Council's Views on Stock Status (4VW American plaice)

Overall Stock Indicator:	low and declining
	Compared to average
Spawning Biomass:	at historic low levels and declining
Total Biomass:	at historic low levels and declining
Recruitment:	no clear trends
Growth & Condition:	no clear trends declining weights at length since early 1990s
Age structure:	shift toward smaller fish
Distribution:	area occupied at or near historic low levels
Recent Exploitation Level:	relative fishing mortality increased since early 1990s
Total Mortality:	steadily increasing trend since late 1980s

Council's Views on Stock Status (4VW yellowtail flounder)

Overall Stock Indicator:	low and declining
	Compared to average
Abundance of mature fish:	low and declining
Abundance of pre-recuits:	generally increasing trend with no apparent contribution to fishery-sized abundance
Growth & Condition:	no clear trends increasing weight at length since early 1990s
Age structure:	no reliable ageing, high #'s pre-recruits; fishery-sized lowest observed
Distribution:	contraction of distribution
Recent Exploitation Level:	relative fishing mortality approx. zero since 1997

WITCH FLOUNDER - 4VWX



PERSPECTIVE

Witch flounder occur from Cape Hatteras to Southern Labrador, usually at 50-300m in waters of 2-6 deg. C. They occur most commonly in deep holes and channels and along the shelf slope on muddy bottom. There is little evidence of extensive migrations but there are seasonal changes in concentrations and availability to fishing gear. On the Scotian Shelf, the spawning period is thought to take place from May to October with a peak in July-August. Food consists mostly of worms and other benthic invertebrates. Witch is a long-lived, slow growing species, reaching a maximum age of about 30 years. Stock structure is not known. There are continuity of distributions between 4V and 4RST and 3Ps. Similarly, there are continuity of distributions between 4X and 5Y. Witch flounder on the Scotian Shelf has been managed within a quota established for all flatfish stocks within each of 4VW and 4X.

Consultations on witch 4VWX were held in Yarmouth, Bedford and Port Hawkesbury, N.S, in November 2002.

ANALYSIS

The 4VWX witch flounder stock was assessed in 1997 separately from other flatfish. The 1997 Stock Status Report and 2002 Groundfish Update indicate that:

- Fishable population declined from 1980s levels to low of 1992-93, improving since 1995 to intermediate levels.
- The survey numbers-per-tow have increased since the low of 1990 and are currently above the 1970-2000 average.
- Recruitment during 1994-99 was strong; recent recruitment has been close to the long-term average.
- Increased effort on witch should be avoided to protect incoming recruitment and allow rebuilding.

No comments were received on this species during consultations conducted in 2002.

In recent years, the Council has requested DFO and industry to investigate ways in which conservation measures may be better targeted towards the individual flatfish species. However, the Council observes there has been little apparent progress in this regard. The primary concern associated with managing each flatfish species separately is with respect to the potential for discarding when prosecuting a mixed flatfish fishery. The Council believes that the opportunity exists to manage witch flounder separately from other flatfish species since the witch flounder catch tends to be a directed effort that occurs in waters deeper and on different bottoms than is normally the case with the other flatfish species. Witch flounder is also a more valuable flatfish species and landings are accounted for separately from the others. It is also noteworthy that in each of 4VW and 4X, the American plaice stock appears to be in great difficulty. The option of terminating directed fishing for this species may soon have to be considered. If witch flounder continues to be managed under the same TAC as American plaice then the directed witch flounder fishery would also be affected.

Based on these considerations, the Council has adjusted its approach to issuing its recommendation for 2003-2004, providing separate recommendations for witch flounder and for the other flatfish species in 4VWX.

The FRCC recommends that in 2003/2004, on a pilot basis, that Fisheries Management consider establishing a separate TAC for 4VWX witch flounder to be set at the level of 600t.

The Council notes that the catch of witch flounder in 4X has been relatively stable since 1977, within a normal range of fluctuation. On the other hand, the catch of witch flounder from 4VW has declined significantly since the mid-to-late 1980s, remaining relatively stable at lower levels since about 1995. The interrelationship of the stock components in the two zones is not known.

Figures are in 000t

Year	1980/89 Avg.	1990/97 Avg.	1998	1999	2000/01	2001/02	2002/03*
TAC							
Catch	2.259	1.217	0.766	0.775	0.561	0.609	0.321

2002 numbers are for the period April 1 to September 30

1. Figures are from the SSR A3-19 (2002) Witch flounder in Division 4VWX

The FRCC recommends that Fisheries Management implement measures to guard against a significant change in the recent relative catch distribution between 4VW and 4X.

Sources

DFO Science

SSR A3-19 (1997) Witch flounder in Division 4VWX
SSR A3-35 (2002) Updates on selected Scotian Shelf groundfish stocks in 2002

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

Written Briefs

Richard Gerrow - Fisherman (2002-010-00203)

Council's Views on Stock Status

Overall Stock Indicator:	intermediate
	Compared to average
Spawning Biomass:	intermediate
Total Biomass:	average
Recruitment:	strong, improved since 1993
Growth and Condition:	no particular observation
Age structure:	good for pre-recruits; older ages low
Distribution:	average
Recent Exploitation Level:	unknown but likely moderate

Figures are in 000t

Year	1980/89 Avg.	1990/97 Avg.	1998	1999	2000/01	2001/02	2002/03*
TAC							
Catch	2.259	1.217	0.766	0.775	0.561	0.609	0.321

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Spawning Biomass:	intermediate
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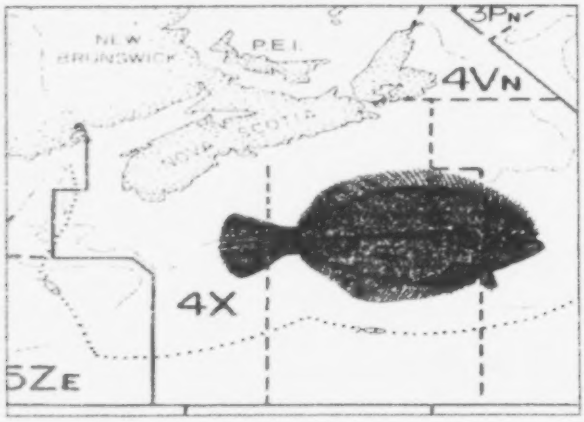
Recruitment:	strong, improved since 1993
Growth and Condition:	no particular observation
Age structure:	good for pre-recruits; older ages low
Distribution:	average
Recent Exploitation Level:	unknown but likely moderate

FLATFISHES - 4X5Y



PERSPECTIVE

Flatfish are bottom dwelling fishes primarily associated with mud and sand bottom. They are unique among other fish in being asymmetrical, both eyes lying on one side of a highly flattened body. Early in life they start swimming on one side, and the eye on the underside migrates to the upper side. Flatfish lie on the bottom on their blind side. Their principal food items include crustaceans, molluscs, polychaete worms and small fishes.

There is much localized variation in species mix associated with depth and temperature. Although the winter flounder, American plaice, and yellowtail flounder populations on the Scotian Shelf have been divided into 4VW and 4X5Y management units, the biological basis for that separation has yet to be established.

Winter flounder: The distribution of winter flounder in Spring, Summer, and Fall from the 1978-84 research vessel(RV) surveys indicates two or three areas of concentration, with the largest and most consistent concentration in the Bay of Fundy, the second on Sable Island Bank and a smaller one on Browns Bank. Further examination of these concentrations using the 1993-97 summer RV surveys indicates that, while adult (>27cm) winter flounder are found in all three areas, juveniles are found only in the Bay of Fundy and Sable Island Bank. Data collected in the 1995-97 ITQ surveys show a continuous distribution from the Bay of Fundy across to Lobster Bay to Browns Bank. The Lobster Bay area is not sampled by the RV survey, giving the incorrect impression of the break in distribution. This suggests a connection between the Bay of Fundy and Browns Bank, but no relation with the Sable Island Bank (4W) concentration. An inshore survey conducted in 1985 indicates that quantities of winter flounder at depths under 60 m, much shallower than the areas surveyed by either the ITQ or RV surveys. Winter flounder have generally been thought to exist as numerous small inshore populations. The observations from the research surveys are not inconsistent with that view, but they do not provide sufficient detail on the distribution to further resolve that issue. The absence of evidence of winter flounder connecting eastern 4X with the western 4W suggest that the current management split is still appropriate for this species.

American plaice: The Spring, Summer and Fall RV surveys (1978-84) indicate that the major concentration of this species occurs in 4VW throughout the year, with a continuous distribution over the Scotian Shelf. The distribution of pre-recruits (<31cm) fish during the summer RV surveys, (1993-97) suggests distribution in both 4X and 4W; larger fish are not abundant in 4X, particularly in the Bay of Fundy. Concentrations occur in the deeper water just inshore of Browns Bank. This distribution is also indicated by the ITQ survey which caught very few plaice in the Bay of Fundy, but consistently caught them inshore of Browns Bank, and in lesser numbers, up to the 4X-4W boundary. American plaice is a deeper water species than winter flounder or yellowtail flounder, and is seldom caught in shallow water stations of the RV or ITQ surveys.

Yellowtail flounder: The Spring, Summer and Fall RV surveys indicate the major concentration of this species occurs in 4VW throughout the year, with minor concentrations in the areas of Browns Bank and the Bay of Fundy. All three surveys indicate some differences between the distribution in 4VW and 4X5Y, as well as between Browns Bank and the Bay of Fundy. The summer RV surveys (1993-97) indicate similar distributions of juvenile and adult fish.

The flatfish fishery is mainly a trawl fishery: the fixed gear component and the mobile gear vessels 65'-100' have relatively small allocations in 4X5Y.

The current mesh size regulation for directing for 4X5Y flatfish is 155 mm square, although much of the flatfish catch is a by-catch of the haddock, pollock, or mixed groundfish fishery which has a mesh size regulation of a minimum of 130 mm square. The 155mm square mesh is an increase from previous years and was implemented in part to try to ensure that the proportion of witch flounder in the catch of flatfish did

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC										4.5	3.375	3.375	3	2	2	2	2	2
Catch	3.92	5.59	4.28	4.65	3.33	6.1	5.8	5.9	4	2.54	2.5	2.46	2.01	1.8	1.7	1.8	1.58	1

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

not exceed current levels and in order to protect incoming recruitment.

Of continuing concern is the "unspecified" portion of the catch; in 1993 that component represented over 80% of the catch. Although the decline in the proportion "unspecified" since 1993 is encouraging, stock assessments use both current and historical catch data in evaluating resource status. Without reliable catch data, any calculations on exploitation will contain high levels of uncertainty.

Analysis

The Groundfish Update in 2002 indicates:

- There is a mixed set of stock conditions: continued worsening situation for American plaice, continued improving situation for yellowtail flounder, relative stability for winter flounder.

4X Winter flounder

- RV survey indicates that the declining trend in abundance of winter flounder, evident in 1998-1999, was reversed in 2000 with a high abundance estimate, and lower, but stable in 2001.

4X American plaice

- the pulse of young American plaice in 1999 did not recruit to the population of mature fish; there is some evidence of improvement in the abundance of pre-recruits in 2002.

4X Yellowtail flounder

- 2002 survey results showed a decline from the high seen in 2001, but remain above average.

While the winter flounder and yellowtail stock abundance are above average, there is no clear evidence that the decline in American plaice has been halted. Industry participants expressed the view that American plaice is down slightly, yellowtail is up slightly, and winter flounder are stable. They recommended continuation of the 2,000t TAC.

On the basis of the overall science data about 4X5Y flatfish, the Council is prepared to recommend a status quo TAC for another year. However, the Council is concerned that the 2002 update for these stocks does not provide even estimates of the catch distribution among the species. In the absence of catch estimates by species, and unless the American plaice stock shows clear signs of improvement, a reduction in the TAC could be considered next year.

The FRCC recommends that Fisheries Science provide annual catch estimates for each species in its 2003 SSR.

Elsewhere in this Report, the Council made a recommendation to establish a separate witch flounder quota on a pilot basis for 2003-2004. A 600t TAC was recommended for witch across 4VWX. The Council notes that approximately 350t of witch flounder has been the annual catch in 4X in recent years. By removing this amount from the 2002-2003 quota of 2,000t, a status quo TAC for the remaining flatfish species in 4X would be 1,650t.

The FRCC recommends that the TAC for 2003/2004 for 4X5Y flatfish be set at 1,650t.

As it is for 4VW flatfishes, the FRCC is committed to conserve 4X5Y flatfish stocks. The first step toward accomplishing this goal is the identification of the flatfish species in catches in 4X5Y. This recommendation has been made repeatedly by the Council in past reports on this stock without effect: it will continue to be the focus of the FRCC's conservation measures for 4X5Y flatfishes until such time as progress is made on this important issue. The Council also notes that witch flounder is apparently able to be reported separately from other flatfishes in the region as evidence that this separation is possible for at least a small but not insignificant component of flatfishes in 4X5Y. Moreover, in the spirit of the Fisheries (General) Regulations, DFO should require fishermen to separate catches by species.

The FRCC recommends DFO require, as a condition of licence, that 100% of catches in the 4X5Y flatfish fishery be recorded by species in the fishing year 2003/2004.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC										4.5	3.375	3.375	3	2	2	2	2	2
Catch	3.92	5.59	4.28	4.65	3.33	6.1	5.8	5.9	4	2.54	2.5	2.46	2.01	1.6	1.7	1.6	1.58	1

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

not exceed current levels and in order to protect incoming recruitment.

Of continuing concern is the "unspecified" portion of the catch; in 1993 that component represented over 80% of the catch. Although the decline in the proportion "unspecified" since 1993 is encouraging, stock assessments use both current and historical catch data in evaluating resource status. Without reliable catch data, any calculations on exploitation will contain high levels of uncertainty.

Analysis

The Groundfish Update in 2002 indicates:

- There is a mixed set of stock conditions: continued worsening situation for American plaice, continued improving situation for yellowtail flounder, relative stability for winter flounder.

4X Winter flounder

- RV survey indicates that the declining trend in abundance of winter flounder, evident in 1998-1999, was reversed in 2000 with a high abundance estimate, and lower, but stable in 2001.

4X American plaice

- the pulse of young American plaice in 1999 did not recruit to the population of mature fish; there is some evidence of improvement in the abundance of pre-recruits in 2002.

4X Yellowtail flounder

- 2002 survey results showed a decline from the high seen in 2001, but remain above average.

While the winter flounder and yellowtail stock abundance are above average, there is no clear evidence that the decline in American plaice has been halted. Industry participants expressed the view that American plaice is down slightly, yellowtail is up slightly, and winter flounder are stable. They recommended continuation of the 2,000t TAC.

On the basis of the overall science data about 4X5Y flatfish, the Council is prepared to recommend a status quo TAC for another year. However, the Council is concerned that the 2002 update for these stocks does not provide even estimates of the catch distribution among the species. In the absence of catch estimates by species, and unless the American plaice stock shows clear signs of improvement, a reduction in the TAC could be considered next year.

The FRCC recommends that Fisheries Science provide annual catch estimates for each species in its 2003 SSR.

Elsewhere in this Report, the Council made a recommendation to establish a separate witch flounder quota on a pilot basis for 2003-2004. A 600t TAC was recommended for witch across 4VWX. The Council notes that approximately 350t of witch flounder has been the annual catch in 4X in recent years. By removing this amount from the 2002-2003 quota of 2,000t, a status quo TAC for the remaining flatfish species in 4X would be 1,650t.

The FRCC recommends that the TAC for 2003/2004 for 4X5Y flatfish be set at 1,650t.

As it is for 4VW flatfishes, the FRCC is committed to conserve 4X5Y flatfish stocks. The first step toward accomplishing this goal is the identification of the flatfish species in catches in 4X5Y. This recommendation has been made repeatedly by the Council in past reports on this stock without effect: it will continue to be the focus of the FRCC's conservation measures for 4X5Y flatfishes until such time as progress is made on this important issue. The Council also notes that witch flounder is apparently able to be reported separately from other flatfishes in the region as evidence that this separation is possible for at least a small but not insignificant component of flatfishes in 4X5Y. Moreover, in the spirit of the Fisheries (General) Regulations, DFO should require fishermen to separate catches by species.

The FRCC recommends DFO require, as a condition of licence, that 100% of catches in the 4X5Y flatfish fishery be recorded by species in the fishing year 2003/2004.

Council's Views on Stock Status (Winter Flounder)

Overall Stock Indicator:	well above 1970-2002 average
	Compared to average
Total abundance:	well above 1970-2002 average
Recruitment:	apparently good
Growth and Condition:	no particular observation
Age Structure:	unknown
Distribution:	unknown
Recent Exploitation Level:	unknown

Sources

DFO Science

SSR A3-21 (1997) Southwest Nova Winter Flounder, American Plaice & Yellowtail Flounder
SSR A3-35 (2002) Updates on selected Scotian Shelf groundfish stocks in 2002

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

Written Briefs

Inshore Fisheries Limited – Claude d'Entremont (2002-010-00205)
Scotia Fundy Mobile Gear Fishermen's Association (2002-010-00210)

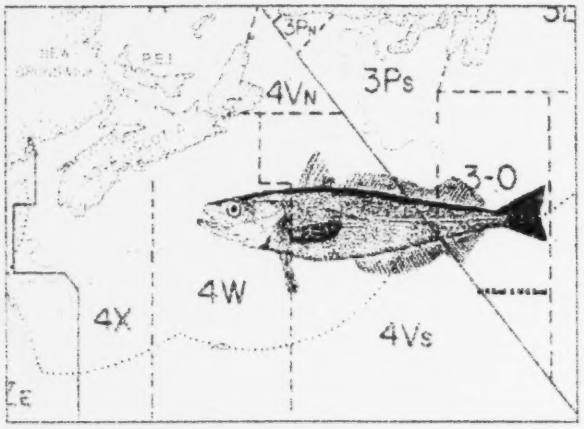
Council's Views on Stock Status (4X5Y American plaice)

Overall Stock Indicator:	declining
	Compared to average
Total Abundance:	below long-term average
Abundance of Pre-recruits:	appears about average but not recruiting to the fishery
Growth and Condition:	no particular observation
Age Structure:	unknown
Distribution:	unknown
Recent Exploitation Level:	unknown

Council's Views on Stock Status (Yellowtail flounder)

Overall Stock Indicator:	above 1970-2002 average
	Compared to average
Total abundance:	above 1970-2002 average
Recruitment:	apparently good
Growth and Condition:	no particular observation
Age Structure:	unknown
Distribution:	unknown
Recent Exploitation Level:	unknown

SILVER HAKE - 4VWX



PERSPECTIVE

Silver hake (Merluccius bilinearis) is a bottom dwelling member of the gadoid family, found from Cape Hatteras to the Grand Banks and the Gulf of St. Lawrence. A major concentration of silver hake occurs on the Scotian Shelf.

Scotian Shelf silver hake are generally found between 7 and 10 deg. C., in deeper water on the shelf edge and Emerald and LaHave basins. Seasonal movements occur during the Summer, as silver hake feed primarily on invertebrates, with krill the predominant prey item. Older fish are piscivorous and exhibit a high degree of cannibalism.

Silver hake exhibit relatively rapid growth with females growing faster than males. Maximum age is 12 years. Maturity is relatively early, with a majority of males maturing at age 2, and females at 3.

Prior to 1977, fishing on the Scotian Shelf was unrestricted in terms of area, mesh size and season. During this period fishing was conducted over the entire shelf, and the use of trawl mesh as small as 40mm was common. In 1977, fishing for this species was restricted to the seaward side of the Small Mesh Gear Line (SMGL), west of 60 deg. W longitude, with a minimum mesh size of 60mm (offshore). In 1994, further restrictions were introduced to minimise incidental catches of cod, haddock and pollock in the silver hake fishery. These included a repositioning of the SMGL to prevent fishing in depths less than 190m and the mandatory use of a separator grate with 40mm bar spacing in the lengthening piece of the trawl. Since 1995, the fishery has been conducted mainly by the Canadian tonnage class 3 (<65') mobile gear fleet in and around Emerald and LaHave Basins and some fishing activity has taken place on the continental slope in 2001 and 2002. The regulated mesh size for this trawl fishery is 55mm square.

ANALYSIS

The outlook from the last full assessment for this resource indicated that the catches should not be allowed to increase from the 1997-99 levels. Condition, length-at-age, and size at maturity are below long term averages. Recruitment prospects are mixed, with the 1999 year-class above average but that of 2000 and 2001 weak. Resource concentration and distribution through the geographical range exhibit positive trends. The 2002 update, however, indicates that the resource status continues to be poor and may be worsening.

The 2002 FRCC consultations on silver hake 4VWX were held in Yarmouth, Bedford, and Port Hawkesbury in November 2002. Generally, fishermen expressed the view that the silver hake stock does not seem to be in as much difficulty as is portrayed in the Update of the Stock Status Report (SSR). Industry report that silver hake are deep water semi-pelagic fish and note that very few research vessel (RV) survey sets concentrate in the deep water, hence they may not indicate the full picture. Fishermen report continued good catch rates in this fishery and significant catches were on the continental slope area. This fishery is almost entirely conducted by Canadian vessels that use separator grates to avoid incidental by-catches of other groundfish species. The regulated mesh size used is 55mm square and is deemed adequate to remove the young fish.

The Council recognizes that there is much uncertainty around this stock. For example, the survey upon which the 4VWX quota is set does not include the Gulf of Maine, however, the catches from this area are applied against the TAC. The USA conducts genetic testing that may shed light on this issue of proper stock definition and structure in this area. The FRCC recommended a TAC of 20,000t be set for this stock in the last 3 years that represents the lowest TAC level over the last 30 years. The RV survey biomass and abundance in 1998-2001 shown signs of rebuilding, however, the recent 2002 update indicates the abundance and biomass are now at the lowest levels seen since 1980. The Council acknowledges that the recruitment indicator shows that the 2000-2001 year-classes are below average and the fishery will depend on these year-classes in 2002-2003. The total mortality esti-

Figures are in 000t

Year	1985	1986	1987	1988	19[illegible]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	100	100	100	120	13[illegible]	135	100	105	75	30	45	48	50	55	30	20	20	20
Catch	75.48	82.86	61.71	74.37	87.99	69.73	171.3	51.23	29.76	8	17.2	26.4	16.9	23.3	20.5	14.5	19.9	11.2

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

mates are high, the condition index shows that silver hake (weight at 25cm) declined to a low level relative to long-term average. The Council's objective is to rebuild this stock and with the current two-year successive low recruitment indicators from the RV survey, the FRCC is erring on the side of caution and recommends a decrease in the TAC.

The FRCC recommends that the TAC for silver hake 4VWX be reduced to 15,000t for the next two fishing seasons (2003/2004 and 2004/2005) unless new information becomes available that would require consideration of further reductions in the interim.

Sources

DFO Science

SSR A3-35 (2002) Updates on selected Scotian Shelf groundfish stocks in 2002

FRCC Consultations

The FRCC held consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

Written Briefs

Eastern Nova Scotia 4VsW Management Board (2002-010-00183)
Inshore Fisheries Limited – Claude d'Entremont (2002-010-00205)
Charlesville Fisheries Ltd. – Raymond Belliveau (2002-010-00206)
Scotia Fundy Inshore Fishermen's Association – E.L. Walters (2002-010-00207)
Scotia Fundy Mobile Gear Fishermen's Association (2002-010-00210)

Council's Views on Stock Status

Overall stock Indicator:	low relative to long term mean.
	Compared to average
Spawning biomass:	likely low
Total Biomass:	likely low
Recruitment:	prospects worsening with 2000 and 2001 year-classes appearing weak
Growth and Condition:	long-term declining trends in biological indices with condition, mean length-at-age, and length with 50% maturity all at low levels relative to long-term mean.
Age Structure:	few year-classes but typical for this species
Distribution:	resource concentration index highest observed indicating that resource is widely distribution. Questions on identity of Gulf of Maine portion of stock.
Recent Exploitation Level:	uncertain

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	100	100	100	120	135	135	100	105	75	30	45	46	50	55	30	20	20	20
Catch	75.48	82.68	61.71	74.37	87.99	69.73	171.3	51.23	29.76	8	17.2	26.4	16.9	23.3	20.5	14.5	19.9	11.2

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

mates are high, the condition index shows that silver hake (weight at 25cm) declined to a low level relative to long-term average. The Council's objective is to rebuild this stock and with the current two-year successive low recruitment indicators from the RV survey, the FRCC is erring on the side of caution and recommends a decrease in the TAC.

The FRCC recommends that the TAC for silver hake 4VWX be reduced to 15,000t for the next two fishing seasons (2003/2004 and 2004/2005) unless new information becomes available that would require consideration of further reductions in the interim.

Sources

DFO Science

SSR A3-35 (2002) Updates on selected Scotian Shelf groundfish stocks in 2002

FRCC Consultations

The FRCC held consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

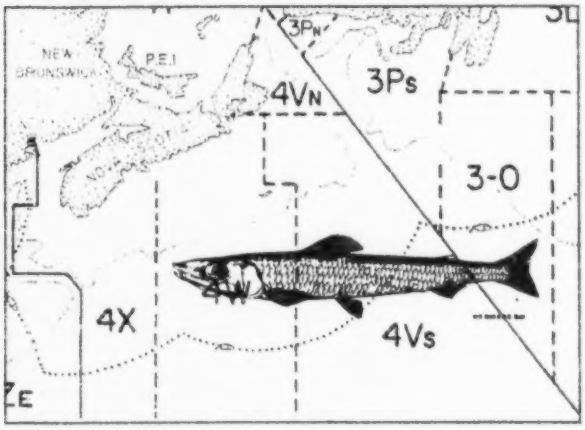
Written Briefs

Eastern Nova Scotia 4VsW Management Board (2002-010-00183)
Inshore Fisheries Limited – Claude d'Entremont (2002-010-00205)
Charlesville Fisheries Ltd. – Raymond Belliveau (2002-010-00206)
Scotia Fundy Inshore Fishermen's Association – E.L. Walters (2002-010-00207)
Scotia Fundy Mobile Gear Fishermen's Association (2002-010-00210)

Council's Views on Stock Status

Overall stock Indicator:	low relative to long term mean.
	Compared to average
Spawning biomass:	likely low
Total Biomass:	likely low
Recruitment:	prospects worsening with 2000 and 2001 year-classes appearing weak
Growth and Condition:	long-term declining trends in biological indices with condition, mean length-at-age, and length with 50% maturity all at low levels relative to long-term mean.
Age Structure:	few year-classes but typical for this species
Distribution:	resource concentration index highest observed indicating that resource is widely distribution. Questions on identity of Gulf of Maine portion of stock.
Recent Exploitation Level:	uncertain

ARGENTINE - 4VWX



PERSPECTIVE

Catches from this stock, which are taken as by-catch in The silver hake fishery, have not exceeded 360t since 1983. Due to overall reduction in effort and catches in the silver hake fishery, catches of argentine remain very low. In November 1993, the Council recommended that, as a precautionary measure, the 1994 TAC for argentine in 4VWX be set at 1,000t and this recommendation has been repeated since.

The Council further recommended for that if this fishery is pursued in a commercial fashion, there be a requirement for a scientifically based data collection program to improve knowledge about the resource.

No comments were received from industry about this Stock during the public consultations in Nova Scotia in November 2002.

ANALYSIS

No assessment of this stock was undertaken in 2002. Scientific information available is from dated Stock Status Reports.

These DFO Stock Status Reports indicate that there is too little known about this stock to generate sufficient data for analytical purposes. Given the by-catch nature of this fishery and the very low catches in recent years, the Council has no reason to change its outlook on this stock. The recommended 2003/2004 TAC is set at 1,000t, as a precautionary measure.

The FRCC recommends that the TAC for 2003/2004 for 4VWX argentine be set at 1,000t.

The FRCC recommends that if this species is pursued in a commercial fashion in the future, there be a requirement for a scientifically based data collection program to improve knowledge about the resource.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	10	10	10	10	10	10	10	10	10	1	1	1	1	1	1	1	1	1
Catch	0.29	0.2	0.06	0.36	0.11	0.22	0.14	0.03	0.15	0	0.11	0	0	0	0	0.009	0.018	0.018

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

1996 CAFSAC Report 4VWX Argentine

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Condition:	unknown
	Compared to average
Spawning Biomass:	unknown
Total Biomass:	unknown
Recruitment:	unknown
Growth and Condition:	unknown
Age Structure:	unknown
Distribution:	unknown
Recent Exploitation Level:	assumed low

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	10	10	10	10	10	10	10	10	10	1	1	1	1	1	1	1	1	1
Catch	0.29	0.2	0.08	0.35	0.11	0.22	0.14	0.03	0.13	0	0.11	0	0	0	0	0.008	0.018	0.018

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

1996 CAFSAC Report 4VWX Argentine

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

Written Briefs

No briefs received

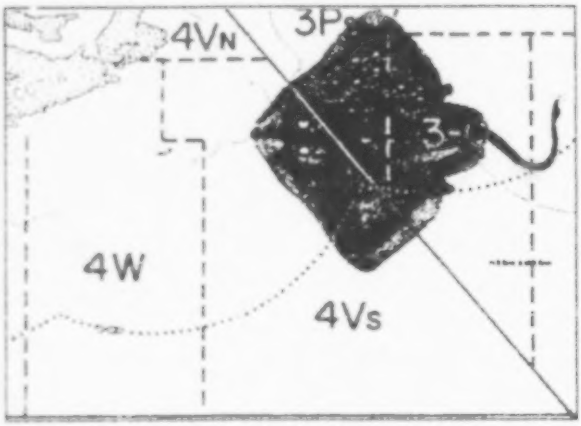
Council's Views on Stock Status

Overall Stock Condition: unknown

Compared to average

Spawning Biomass:	unknown
Total Biomass:	unknown
Recruitment:	unknown
Growth and Condition:	unknown
Age Structure:	unknown
Distribution:	unknown
Recent Exploitation Level:	assumed low

SKATES - 4VSW



PERSPECTIVE

Winter skate occurs in the southern waters of Georges Bank, inner Bay of Fundy and on the offshore banks of the eastern Scotian Shelf. Winter skates are the primary focus of the commercial fishery and constitute greater than 90% of the catch. Thorny skate occurs as a by-catch in this fishery and only the largest individuals are retained.

Like other elasmobranchs, skates are slow growing, produce very few young each year and thus are slow to increase in population numbers. These factors would suggest that skate is able to support only a low exploitation rate. Length at maturity occurs at around 75cm for 50% of female winter skate. Preliminary ageing of winter skate suggests that the length at 50% maturity coincides with individuals, which are 7-8 years old. Historical information shows that skates consume considerable quantities of sand lance. Skate predators have yet to be identified, but are assumed to exist.

Most elasmobranch fisheries have followed a general pattern of high initial exploitation followed by a rapid collapse. The intention has been that the "developing" skate fishery on the eastern Scotian Shelf not follow this course. The knowledge of skate on the Scotian Shelf is limited, however recent research is increasing the information base.

ANALYSIS

The outlook from the 2002 Stock Status Report (SSR) based on the assessment of the stock included the following:

- Landings in the directed fishery have declined from 2,152t in 1994 to 200t in 2002 reflecting progressive reductions in TAC.
- Skate biomass has been declining since mid 1970's. Since mid 1990's, abundance has been low and stable.
- Production has been low since 1995.
- Since mid 1990's, fishing mortality has declined, consistent with decreases in catch.

DFO surveys suggest that the abundance, particularly that of larger skate, and productivity are very low. Industry and fisheries data, available since 1994, suggests that stock size has been relatively stable and that fishing mortality has declined. The decline in skates occurred mainly before the beginning of the directed fishery and therefore, current low stock size is unlikely to have been the result of the directed fishery since 1994. The FRCC recommends that the current TAC of 200t be maintained in order to continue to have a commercial fishery providing valuable information to assist in monitoring stock status.

The FRCC recommends the TAC for 2003/2004 for 4VsW skate be set at 200t to support a joint industry/ DFO survey.

Figures are in 000t

Year	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	2000/01	2001/02	2002/03*
TAC										2	1.6	1.6	1.2	1.2	0.6	0.6	0.4	0.2
Catch					5.8	5	4.3	2.5	2.1	3.1		1.8	1.04	0.525	0.623	0.4	0.31	0.16

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A3-29 (2002) 4VsW Winter skate

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	low
	Compared to average
Spawning Biomass:	no particular observation
Total Biomass:	below average (thorny skates)
Recruitment:	below average
Growth and Condition:	size declining
Age Structure:	below average
Distribution:	below average
Recent Exploitation Level:	unsustainable

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC										2	1.6	1.6	1.2	1.2	0.6	0.6	0.4	0.2
Catch					3.8	5	4.3	2.3	2.1	3.1		1.6	1.04	0.525	0.623	0.4	0.31	0.15

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A3-29 (2002) 4VsW Winter skate

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

Written Briefs

No briefs received

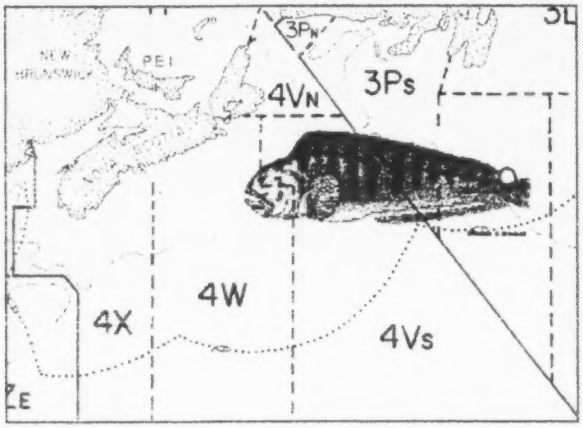
Council's Views on Stock Status

Overall Stock Indicator: low

Compared to average

Spawning Biomass:	no particular observation
Total Biomass:	below average (thorny skates)
Recruitment:	below average
Growth and Condition:	size declining
Age Structure:	below average
Distribution:	below average
Recent Exploitation Level:	unsustainable

WOLFFISH - 4VWX+5YZc



PERSPECTIVE

There are three species of Atlantic wolffish found in Canadian waters. Striped wolffish is the main species found on the Scotian Shelf and George's Bank. Wolffish are a solitary fish thought to have limited migratory range. They are relatively prevalent in the approaches to the Bay of Fundy, Browns, LaHave and Roseway Banks. They are demersal, usually found between 50 and 150 meters, and have a wide temperature tolerance. Wolffish feed on rocky bottoms on various invertebrate species such as crabs, whelks and sea urchins. Wolffish grow slowly and mature after approximately 10 years. Landings were between 1000 and 1500t in the 1960's and increased to about 4000t in the 1980's, and then dropped steadily in the 1990's. Wolffish are caught by both mobile and fixed gear sectors as a by-catch species.

ANALYSIS

There was virtually no discussion of this stock during any of the consultation sessions held in November 2002. Limited input advised a status quo approach.

This stock was fully assessed in 2002. The 2002 Stock Status Report (SSR) indicates that:

- The abundance of immature fish is above the 1970-2001 average.
- The abundance of mature fish continues to be at or near record low.
- Relative fishing mortality has been low since the mid 1990s.
- Condition of mature fish is lower than average
- Area occupied within 4VWX continues to be near record.
- 2001 Canadian landings of Striped wolffish in 4VWX+5Ze are estimated to have been 133t.

While there are signs of increasing recruitment on the Scotian Shelf, until this recruitment matures, and the mature biomass improves, care must be taken to keep fishing mortality at a minimum.

The FRCC recommends that there be no directed fishery for Atlantic wolffish in 4VWX in the 2003/ 2004 fishing year.

The FRCC is concerned that developing markets for wolffish have encouraged <65' mobile gear vessels to 'top up' on wolffish after directing for other groundfish on a trip. Although within the target fisheries managers limit catches for this stock, this activity clearly violates the spirit of the recommendation that there be no directed fishery on this stock. As long as the fishing effort continues in known fishing areas in 4X where this species is concentrated, it may contribute to continued delay in stock recovery. It is also noteworthy that the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has classified striped wolfish to be of 'special interest'.

The FRCC notes that the current regime is structured around an allowable by-catch ranging from 10% and up to 20% at certain times of the year. This does not compare well with the 5% allowable by-catch of species under moratoria. While it is unlikely that the current fishing mortality is having any significant negative influence on the pace of recovery of this stock, it is appropriate for fisheries managers and industry to bring the catch of this stock down to a minimum.

The FRCC recommends that this be a restrictive by-catch fishery only; measures should be implemented to minimize by-catches of wolffish in all fisheries directed at other species, and to stop any 'top-up' practices that may be occurring.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC																		
Catch					0.6	0.6	0.6	0.7	0.6	0.4	0.24	0.8	1.09	0.53	0.59			

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

Research Document 2001 Summer Groundfish Survey
SSR A3-31 (2002) Wolffish on the Scotian Shelf and Georges Bank and in the Gulf of St. Lawrence (Subarea 4 and Div. 5YZe)

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

Written Brief

Scotia Fundy Mobile Gear Fishermen's Association (2002-010-00210)
Inshore Fisheries Limited – Claude d'Entremont (2002-010-00205)

Council's Views on Stock Status

Overall Stock Indicator:	low
	Compared to average
Spawning Biomass:	very low
Total Abundance:	above 1970-2001 average
Recruitment:	above 1970-2001 average
Growth and Condition:	below average
Age Structure:	poor
Distribution:	below average
Recent Exploitation Level:	has remained low

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC																		
Catch					0.6	0.6	0.5	0.7	0.6	0.4	0.24	0.6	1.03	0.53	0.53			

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

Research Document 2001 Summer Groundfish Survey
SSR A3-31 (2002) Wolffish on the Scotian Shelf and Georges Bank and in the Gulf of St. Lawrence (Subarea 4 and Div. 5YZe)

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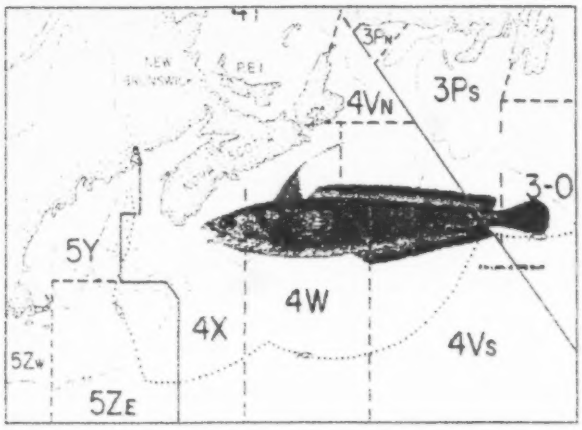
Recent Exploitation Level:	has remained low

WHITE HAKE - 4VW



PERSPECTIVE

White hake are bottom dwelling fish that prefer mud bottoms, temperatures between 3 and 10 degrees and depths of 50 to 200m. Depth range varies with life history. Spawning times are not well understood.

Landings have generally been low in this management area ranging from 447t in 1998 to 391t in 2001. White hake is primarily landed by fixed gear sectors as a by-catch of other directed fisheries.

Since 1998, scientific analysis of white hake has been split into two management areas 4VW and 4X5Zc and now also includes 4Vn as a separately assessed stocks subcomponent. White hake across the entire Scotian Shelf and Gulf of Maine in 4VWX and 5Zc is managed based on sector and gear suballocations related to each management area. Landings are minimal in 4Vn and slightly higher in 4VW. The majority of hake is landed in 4X and 5Zc.

ANALYSIS

White hake was assessed in 2002. The 2002 Stock Status Report (SSR) indicates that:

- Total landings have declined since 1987; landings in 1998 were the lowest since 1968 but have increased slightly in 2000 and 2001.
- Abundance indicators remain low, but total mortality remains high.
- Production remains poor, environmental conditions (bottom temperatures) remain positive. However, fishermen feel Commercial Catch Rates are unreliable as an index of abundance because of management conditions.
- Research vessel survey abundance estimates from Canadian (Summer 4VWX, Spring 4VsW, Spring Georges Bank) and US (Spring and Fall offshore) sources are all near record lows.
- The size composition of the Summer research vessel survey catches in 4X has been getting smaller since 1995, and mean weights of individual fish in 4VWX surveys have been declining since 1984.
- There are few large fish in the population.
- The assessment of this stock is uncertain due to poor stock definition and incomplete sampling by the research vessel survey gear.

Recommendations from industry ranged from status quo to an increased cap limit to a restored commercial TAC of 3,100t as in pre-1998 levels. Fishermen continue to observe high abundance throughout 4VWs since 1998 and maintain that the stock is improving. Increased abundance of white hake has been linked to the return of warmer water temperatures after a cold water event affected the Scotian Shelf in 1998.

Industry feels that research vessel (RV) data are a poor indicator of abundance. Although fishermen claim they are not directing for white hake, on some trips, the majority of the landings are white hake. It was indicated that white hake is at times unavoidable and is interfering with directed fisheries. White hake are reported to be numerous and interspersed with Atlantic halibut and pollock. Feedback from fishermen indicate continued improved abundance as evidenced by the significant increases of catch in the joint DFO / Industry Sentinel and Halibut Longline Surveys.

The 2002 SSR shows little increase in this stock. Although DFO advises that all five survey results show stock to be near record lows, they also contain uncertainties. Faced with a continued strong discrepancy in opinions of stock status and uncertainties, coupled with conflicting evidence on both sides, it is difficult to reconcile the trends in the stock.

The FRCC recommends that there be no directed fishery for white hake in 4VW in 2003/2004.

The status of white hake in 4VW remains poor and requires rebuilding. Vigilance is required to insure that removals are maintained to a minimum required to allow directed fisheries on other species to occur.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC												0.5	0.7	0.7		No directed fishery		
Catch					3.4	3.7	2.9	3.4	3.8	3.1		0.58	0.5	0.4	0.4	0.34	0.31	0.17

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

The FRCC recommends that catches should not exceed those required for the normal conduct of other fisheries.

Last year the FRCC recommended that DFO Science in conjunction with industry continue the morphometrics testing program on white hake to assist in identifying potential stock subcomponents delineations. The FRCC would like to know when it can expect that this information will be reported to the public, as this information will be required for long term planning (FRCP) for this stock.

Sources

DFO Science

SSR A3-10 (2002) White Hake in 4VWX and 5

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

Written Briefs

Eastern Nova Scotia 4VsW Management Board (2002-010-00183)

Council's Views on Stock Status

Overall Stock Indicator:	very low
	Compared to average
Spawning Biomass:	very low
Total Biomass:	very low
Recruitment	unknown
Growth and Condition:	declining since 1984
Age Structure:	unknown
Distribution:	stock structure complex, not well understood
Recent Exploitation Level:	very high in mid 1990's, currently low

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC												0.5	0.7	0.7		No directed fishery		
Catch					3.4	3.7	2.9	3.4	3.8	3.1		0.56	0.5	0.4	0.4	0.34	0.31	0.17

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

The FRCC recommends that catches should not exceed those required for the normal conduct of other fisheries.

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SSR A3-10 (2002) White Hake in 4VWX and 5

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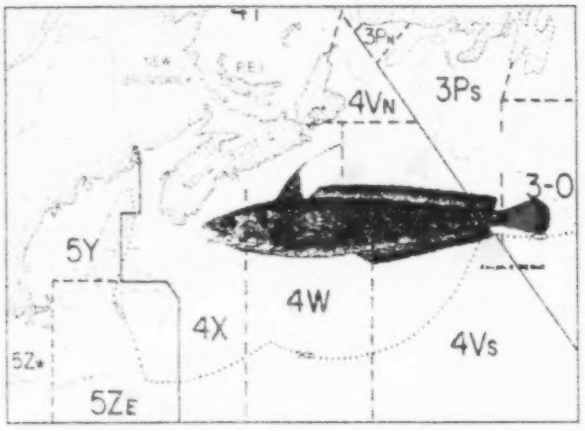
Overall Stock Indicator:	very low
	Compared to average
Spawning Biomass:	very low
Total Biomass:	very low
Recruitment	unknown
Growth and Condition:	declining since 1984
Age Structure:	unknown
Distribution:	stock structure complex, not well understood
Recent Exploitation Level:	very high in mid 1990's, currently low

WHITE HAKE - 4X5Zc



PERSPECTIVE

White hake are bottom dwelling fish that prefer mud bottoms, temperatures between 3 and 10 degrees and depths of 50 to 200m. Depth range varies with life history. Spawning times are not well understood.

The majority of white hake landings occur in this management area were estimated at over 1,800t in 2001. White hake is primarily landed by fixed gear sectors as a by-catch of other directed fisheries.

ANALYSIS

The 2002 Stock Status Report (SSR) indicates that:

- Abundance has increased recently and continues to improve.
- Environmental conditions (bottom temperature) have improved and remain favourable.
- Relative fishing mortality has been low and remains low.
- Production has declined since the 1980's and remains poor.
- Research vessel survey abundance estimates from Canadian (Summer 4VXWX, Spring 4VsW, Spring Georges Bank) and US (Spring and Fall offshore) sources are all near record lows.
- Commercial Catch Rates of index white hake fishermen have increased across all fleets since a low in 1998.
- The size composition of the Summer research vessel survey catches in 4X has been getting smaller since 1995, and mean weights of individual fish in 4VWX surveys have been declining since 1984.
- Mortality rates for 4X white hake derived from Summer research vessel survey data depict exploitation at or above 50% throughout the 1990's.
- White hake in 4X + 5Zc are showing signs of recovery through abundance indicators however production indicators remain negative, continued caution is required.
- The assessment of this stock is uncertain due to poor stock definition and incomplete sampling by the research vessel survey gear.

Industry feels that research vessel (RV) data are a poor indicator of abundance. They also feel that commercial CPUE data do not reflect abundance of the stock. Although fishermen claim they are not directing for white hake, they are landing a majority of white hake in some trips. It was indicated that white hake is at times unavoidable and is interfering with directed fisheries. White hake are reported to be numerous and interspersed with Atlantic halibut and pollock. Fishermen reported that white hake were plentiful in 4X5Zc, in areas where they were never seen before and especially in deep water, and that as a consequence, by-catches were causing a problem while directing for other species. Due to these uncertainties, it is difficult to reconcile trends in stock status between industry and scientific advice.

In the 2002 SSR, the Summer RV survey numbers, ITQ Survey and Halibut Survey show that an abundance of white hake increased for 3 or 4 years leading to 2001, but decreased in 2002. This does not include the Halibut Survey numbers in 2002 for which there is no data yet. The status of white hake in 4X5Zc has been poor and it has shown some signs of recovery. Any increase in catch could jeopardise rebuilding.

The FRCC recommends that there be no directed fishery for white hake in 4X5Zc in 2003/2004.

Vigilance is required to ensure that removals are maintained to a minimum required to allow directed fisheries on other species to occur.

The FRCC recommends catches of white hake should not exceed those required for the normal conduct of other fisheries.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	[illegible]	[illegible]	[illegible]
TAC												2.0	2.8	2.8		No directed fishery		
Catch					3.4	3.7	2.9	3.4	3.8	3.1		2.8	2.8	1.3	1.7	2.07	3.06	3.1

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A3-10 (2001) White Hake in 4VWX and 5
SSR A3-10 (2002) White Hake in 4VWX and 5

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

Written Briefs

Yarmouth County Fixed Gear Association – C. Davis & L. Blackler (2002-010-00178)
Inshore Fisheries Limited – Claude d'Entremont (2002-010-00205)
Scotia Fundy Inshore Fishermen's Association – E.L. Walters (2002-010-00207)
Scotia Fundy Mobile Gear Fishermen's Association (2002-010-00210)
Shelburne County Competitive Fishermen's Association – P. Decker & V. Wolfe (2002-010-00187)

Council's Views on Stock Status

Overall Stock Indicator:	low but improving
	Compared to average
Spawning Biomass:	low but improving
Total Biomass:	low but improving
Recruitment:	unknown
Growth and Condition:	declining since 1984
Age Structure:	unknown
Distribution:	stock structure complex, not well understood
Recent Exploitation Level:	very high in mid 1990's

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC												2.0	2.8	2.8		No directed fishery		
Catch					3.4	3.7	2.8	3.4	3.8	3.1		2.8	2.8	1.3	1.7	2.07	2.06	2.1

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A3-10 (2001) White Hake in 4VWX and 5
SSR A3-10 (2002) White Hake in 4VWX and 5

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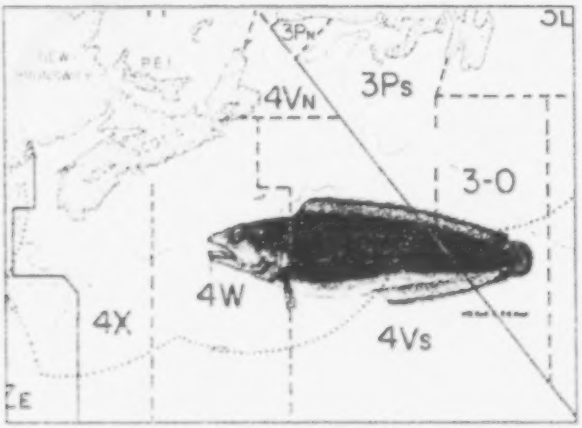
Shelburne County Competitive Fishermen's Association – P. Decker & V. Wolfe (2002-010-00187)

Council's Views on Stock Status

Overall Stock Indicator:	low but improving
	Compared to average
Spawning Biomass:	low but improving
Total Biomass:	low but improving
Recruitment:	unknown
Growth and Condition:	declining since 1984
Age Structure:	unknown
Distribution:	stock structure complex, not well understood
Recent Exploitation Level:	very high in mid 1990's

Cusk - 4VWX



Perspective

Cusk is a solitary slow-moving species found primarily on the southwestern Scotian Shelf. Cusk prefer rocky, gravel and mud bottoms and depths of 75 - 150 meters and warmer waters of 6-10 degrees. Little is known of the biology related to spawning, diet and migration.

Although there has been some directed fishery activity in the past, cusk has historically been caught mainly as a by-catch of other commercial species with little focus on overall stock structure and status. Cusk are primarily caught by long line and are commonly mixed with and caught with white hake and halibut in directed halibut fisheries.

Catches have historically averaged 3,400t annually. However, declining landings and negative indicators resulted in a cap of 1,000t being placed on the stock in 1999. Approximately 80% of landings come from area 4X from a maximum of 5,130t in 1973 to a low of 717 in 2000. Landings increased to 1,037 tons in 2001. Landings in 4W are smaller and have rarely exceeded 500t and were 101t in 2001. Landings in 4V are minimal.

FRCC recommendations and DFO restrictions have attempted to limit excessive by-catches, although cusk landings continue to be high they likely will remain under 1,000t in the 2002/2003 fishing year.

Analysis

This stock was last fully assessed in 1998. Little new information has been provided other than RV survey updates since 1998. The 1998 Stock Status Report (SSR) and the Groundfish Updates in 2000, 2001 and 2002 indicate that:

- Landings have remained below the long-term mean of 3469t since 1993. After a cap was placed on overall landings in 1999, landings were 826t in 2000, 1,138t (15 months) in 2001 and will likely remain under 1,000t in 2002.
- Research vessel survey mean weight per tow declined abruptly in 1992 and has remained below the long-term mean of 1.29 kg since that time.
- The cusk stock collapsed abruptly between 1991 and 1993 and remains very low.
- Research vessel survey catches have shown a restriction of distribution to the western portion of 4X with negligible landings in 4VW. The geographic distribution of the resource continues to become more concentrated.
- This stock continues to show no sign of improvement in 2001. It is possible that the 1,000t cap placed on this stock is not providing adequate restrictions on catches to allow for the stock to rebuild and more restrictive measures may be required.

Public consultations on this stock were held in Yarmouth, Bedford and Port Hawkesbury in November 2002. Limited input from Industry agreed with science information that the stock remains very low suggesting status quo and continued restrictions on landings are prudent. However, despite the drastic stock decline indicated since the early 1990's, cusk are easily caught at traditional levels by certain fishers and appear to be numerous in some areas and fisheries. Cusk is unavoidable in some longline fisheries, and is increasingly common in lobster traps, so it was suggested a reasonable by-catch allowance is required. There were reports of an increase in abundance in 2002. It was stated that if more severe restrictions are imposed, discarding problems may result due to substantial amounts of cusk being mixed with other species. It was also stated by industry that the recently implemented sea coral closure in 4X may indirectly provide protection to concentrations of cusk in this area.

Cusk have shown a gradual decline in landings, and reduction in geographic distribution from east to west since surveys began in 1970. There was a drastic and abrupt reduction in abundance noted in 1992 that has persisted to the present. There is also a decrease in both fish condition and abundance of larger fish greater than 50 centimeters. Many of these characteristics and

Figures are in000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC												1.5			No directed fishery			
Catch					2.7	3.1	3.8	4.2	2.4	1.9		1.91	1.7	1.49	1.05	0.83	1.14	0.9

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

trends are present in other species although not to the extent seen in cusk since 1992.

A more comprehensive assessment of this stock anticipated by the FRCC in 2001 and again in 2002 was not conducted, therefore new information on stock status is limited to fishery and research vessel survey updates. However, all available information indicates that the FRCC should not change its outlook on this stock.

Scientific input indicates caution is required but new information is lacking, however observations from industry appear to indicate that the cusk stock has not declined further, and has increased in certain areas. This pattern could indicate increasing numbers in some areas or an indication of concentration of the resource. Based on somewhat conflicting views of stock status and the prevalence and availability of cusk mixed with other species, future catches should be limited to present levels and reduced if possible, subject to the operational realities of the mixed longline fishery situation. However, due to continued negative signs regarding overall abundance and geographic distribution, the current restricted by-catch should be continued to avoid further deterioration of this stock and to promote rebuilding efforts.

The FRCC recommends that there be no directed fishery for cusk in 4VWX in 2003/2004.

Due to recommendations for restricted by-catch fisheries and concern for this stock over the past few years, landings have been maintained at recent historical levels with no significant sign of recovery. However, it appears incidental landings of cusk caught in other directed fisheries are stable in 2002.

The FRCC remains concerned that available markets for cusk may encourage some fishers to 'top up' on cusk after targeting another groundfish on a trip.

A review of distribution of catches reveals that although cusk is concentrated over the entire range, it is still widely encountered in many areas within 4X where longline fisheries occur. Therefore, it may not be as concentrated and susceptible to targeted fishing as suspected.

However, while catches remain within the management limit for this stock, the possibility remains that cusk are present in high densities in selected areas and it is possible fishermen may continue to either target and/or not avoid cusk. This activity clearly violates the spirit of the FRCC recommendation of no directed fishery, by-catch fishery, or otherwise on this stock. Due to the previous drastic decline and lack of recovery this remains cause for concern by many interests.

If directed fishing effort continues in known fishing areas or refuges in 4X where this species is concentrated, it may inhibit chances for recovery or contribute to a further decline in stock status. This situation requires close monitoring. It is felt that due to concerns regarding this species, every effort should be made to eliminate any known and excessive directed fishing to reduce levels of by-catch.

The FRCC recommends that DFO examine and report on the absolute catch of cusk over time by detailed statistical area.

The FRCC recommends that there be a restrictive by-catch fishery only and measures should be continued or enforced to ensure present by-catch levels of cusk are reduced in all fisheries directed at other species.

Given the dramatic decline and poor status of this stock, and unavoidable continued fishing effort on this by-catch species, there would appear to be a need to continue to advise industry of the possible consequences on future fishing opportunities should the species be considered endangered.

The FRCC recommends DFO continue to advise fishing sectors of the importance of conservation measures to the future of this species as appropriate.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
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Due to recommendations for restricted by-catch fisheries and concern for this stock over the past few years, landings have been maintained at recent historical levels with no significant sign of recovery. However, it appears incidental landings of cusk caught in other directed fisheries are stable in 2002.

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If directed fishing effort continues in known fishing areas or refuges in 4X where this species is concentrated, it may inhibit chances for recovery or contribute to a further decline in stock status. This situation requires close monitoring. It is felt that due to concerns regarding this species, every effort should be made to eliminate any known and excessive directed fishing to reduce levels of by-catch.

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The FRCC recommends DFO continue to advise fishing sectors of the importance of conservation measures to the future of this species as appropriate.

Sources

DFO Science

SSR A3-14 (1998) Cusk on the Scotian Shelf
SSR A3-35 (2001) Updates on selected Scotian Shelf groundfish stocks in 2001
SSR A3-35 (2002) Updates on selected Scotian Shelf groundfish stocks in 2002
Research document 2002/089 - 2002 Summer Groundfish Survey

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS. (November 19)
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Port Hawkesbury, NS (November 21)

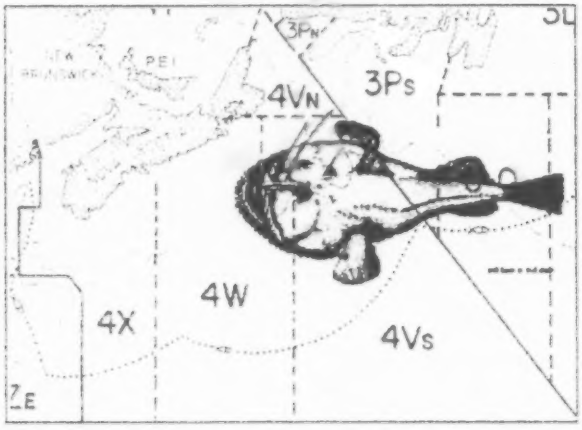
Written Briefs

Yarmouth County Fixed Gear Association – C. Davis & L. Blackler (2002-010-00178)
Eastern Nova Scotia 4VsW Management Board (2002-010-00183)
Scotia Fundy Inshore Fishermen's Association – E.L. Walters (2002-010-00207)

Council's Views on Stock Status

Overall Stock Indicator:	low
	Compared to average
Spawning Biomss:	low
Total Biomass:	historical low
Recruitment:	no sign
Growth and Codition:	poor
Age Structure:	below average
Distribution:	no significant change(contracted)
Recent Exploitaion Level:	stable

MONKFISH - 4VWX



PERSPECTIVE

Monkfish also called goosefish or angler, ranges from the Grand Banks and Northern Gulf of St. Lawrence south to Cape Hatteras, North Carolina. Individuals have been collected from inshore areas to depths greater than 800 m, although highest concentrations occur between 70-100m and in deeper waters of about 190m. They have been taken at temperatures from 0-24 deg. C., but in Canadian waters, appear most abundant between 3-9 deg. C.

The stock structure of monkfish is unknown. The degree of mixing in both USA and Canadian waters is unknown although large scale migrations have not been reported. Spawning appears to take place in Canadian waters during the Summer months, thus suggesting some degree of independence between the various components.

Growth appears to be fairly rapid and similar for both sexes up to ages 4, (47-48 cm). After this, females grow a bit more rapidly and seem to live somewhat longer, up to 12 years, reaching a size of over 100cm while the males have not been found older than age 9, at approximately 90cm.

Sexual maturity occurs between ages 3 and 4 and spawning may take place from Spring through to autumn depending on latitude.

Monkfish have consistently been caught as a by-catch of the commercial scallop fishery and commercial groundfish fisheries. Markets were developed in the 1970's and 1980's and since then, monkfish have been retained and sold rather than being discarded as undesirable by-catch. Total landings from the two NAFO areas, 4VW and 4X, through the 1970's averaged 6,570t. With the inclusion of 5Zc in the 1980's, landings averaged 1,637t. The 1990-96 average landings were 1,590t. It appears landings in 2002 will remain near levels of previous years at approximately 1,000t.

ANALYSIS

The 2002 Update to the Stock Status Report (SSR) published by DFO indicates:

- Landings have averaged 1,500t since 1980 and have been approximately 1,000t in 2000-2002.
- Abundance of adult monkfish in 4X remains at or below average. The proportion of large fish (>60cms) continues to decline and biomass remains low.
- There is improved abundance of immature fish in 4X since 1992. However this does not appear to be resulting in biomass increases.
- Indicators for monkfish in 4VW show similar trends to 4X, fishery removals have been much lower.
- Continuation of a cautious approach to harvesting is appropriate.

The monkfish population appears to have gone t. ough a period of low productivity and abundance in the late 1980's to the early 1990's. The factors causing this may still be affecting the present population. There are continued signs of very strong recruitment since 1995. However, the adult population over 60 centimeters remains low, with relatively few large fish present in the population. Productivity remains poor and fish mortality is thought to be high.

Many of the changes observed in both areas may be driven by changes in environmental conditions.

Consultations on monkfish 4VWX were held in Yarmouth, Bedford and Port Hawkesbury in November 2002. The general comments from industry were that the monkfish resource appears healthy and to maintain status quo for 2003. Concerns were expressed regarding the potential catch of monkfish in scallop gear and the lack of by-catch restrictions in the scallop fleet.

The lack of improved recruitment impacting on adult biomass remains a large question with this stock. It is not clear whether reduced fishing mortality would improve this situation related to stock structure based on observations in 4VW where fishing effort is very

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC												0.7	0.2		No directed fishery			
Catch				0.6	0.8	0.8	0.8	0.8	1.2			0.71	1.4	0.82	1.10	0.78	0.83	0.8

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

low. Although catch levels have been declining recently, they remain relatively high and a cautious approach should be taken until the fate of improved recruitment on the larger fish population can be determined.

The FRCC recommends that there be no directed fishery for monkfish in 4VWX+5Zc in 2003/2004.

The FRCC recommends that catches should not exceed those required for the normal conduct of other fisheries.

The FRCC continues to be concerned about the incidences of monkfish by-catch in the scallop fishery in the Bay of Fundy, especially given recent indications of substantial recruitment and an increase in the scallop biomass. Although by-catch levels have declined substantially in recent years, increased fishing effort by the scallop fleet in response to changing markets or increased effort due to increasing scallop abundance has the potential to substantially increase monkfish by-catch, which is unrestricted in this fleet sector.

The FRCC recommends that levels of monkfish by-catch and removals by the scallop fleets be closely monitored and documented to determine the level of monkfish by-catch due to increasing fishing effort on scallop stocks. A by-catch limit should be considered as appropriate if levels rise significantly.

In response to previous FRCC recommendations regarding measures to evaluate localized concentrations of some species, DFO has noted that current exploitation in these areas may not be sustainable. Given this response, it is implicit that lower levels of exploitation be enforced.

Favorable market conditions could result in increased fishing efforts at any time by the mobile groundfish sector. It is therefore critical to learn more about what exploitation limits are sustainable on localized populations of monkfish in order to prevent excessive depletion and manage these areas more effectively.

The FRCC recommends that DFO Fisheries Management, in consultation with industry, develop harvest plans in other fisheries to avoid excessive by-catch of monkfish in localized areas.

Sources

DFO Science

SSR A3-35 (2002) Updates on Selected Scotian Shelf Groundfish Stocks in 2002

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)
Port Hawkesbury, NS (November 21)

Written Briefs

Inshore Fisheries Limited – Claude d'Entremont (2002)
Scotia Fundy Mobile Gear Fishermen's Association – Brian Giroux

Council's Views on Stock Status

Overall Stock Indicator:	below average
	Compared to average
Spawning Biomass:	below average, large fish declining
Total Biomass:	below average
Recruitment:	strong / Increasing
Growth and Condition:	stable
Age Structure:	no particular observation
Distribution:	average/ Increasing
Recent Exploitation Level:	above average

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC												0.7	0.2		No directed fishery			
Catch					0.6	0.8	0.8	0.8	0.6	1.2		0.71	1.4	0.82	1.10	0.78	0.83	0.6

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Spawning Biomass:	below average, large fish declining
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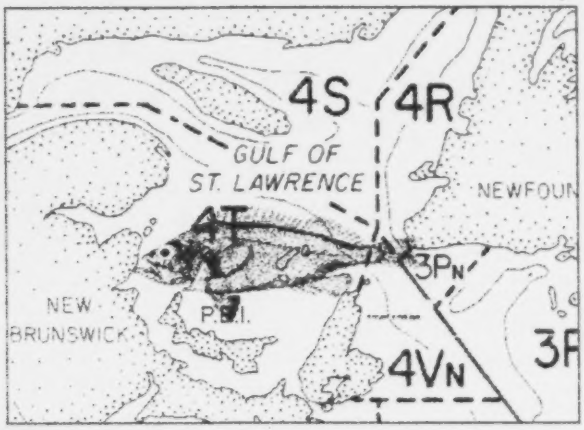
Recruitment:	strong / Increasing
Growth and Condition:	stable
Age Structure:	no particular observation
Distribution:	average/ Increasing
Recent Exploitation Level:	above average

Chapter 3: Redfish Stocks
Stock-by-Stock Recommendations

Redfish Unit 1 - 4RST+3Pn (Jan-May)+4Vn (Jan-May)



Perspective

Redfish is a long lived species with a low fecundity rate. The spawning stock biomass is supported by few strong year-classes, usually appearing every 10 years. In the past decade, recruitment has remained low. The Unit 1 Redfish stock was implemented in 1993 and was previously managed as Divisions 4RST. It supported a large fishery in which landings averaged 82,000t during the years 1970-1976. Another peak of biomass, leading to high catches, was observed at the beginning of the 90s. The biomass decreased afterward steadily. A moratorium was implemented in 1995 and has continued since. For 1997, the FRCC recommended that cooperative industry science surveys take place. For 1998, the FRCC further recommended that a joint industry science Sentinel Survey be established, on an ongoing basis, to include both a fully scientific component and a component to re-establish the commercial catch rate index. It was recommended that catches for this program not exceed 1,000t. This program was recommended to be continued in each of year 1999 through 2001, with the level of available quota being increased to 2,000t each year in order to improve the validity of the Catch Per Unit of Effort (CPUE) index with increased sampling. For the 2001/2002 fishery, the Council requested that DFO Science review the stock area definitions between the Units 1 and 2 stock management areas.

Industry consultation on redfish took place in Bedford, Nova Scotia in November 2002. One brief was received from industry lending support for the continuance of the Index and Sentinel fisheries on the grounds that the information obtained increased resolution of the stock's status.

Analysis

In 2002, DFO Science provided only a summary of the stock update. The summary information provided to the Council is based on one more year's data on: the science Research Vessel (RV) survey and minimum trawlable biomass index, the GEAC grid survey, the Commercial Index and the Sentinel Surveys. No new information is provided on the mixing issue between Units 1 and 2.

The 2002 summary of this stock status from DFO indicates that, as for 2001:

- The biomass remains stable at low levels since 1995, and there is no sign of strong year-classes of juveniles present in the stock.
- Catch rates overall for all surveys were unchanged at low levels for all four surveys.
- Overall, the prognosis for the stock remains poor for the foreseeable future.

The FRCC recommends that there be no directed commercial fishery for Unit 1 redfish for the fishing years 2003/2004, and 2004/2005.

Once again, the FRCC recognizes that Commercial Index and the industry/science survey, re-established in 1998, have helped to put redfish fishers in direct contact with the resource and has generated important information about the stock. The Council continues to believe that these activities should continue in order to generate information that may be used to supplement that which is obtained through DFO's annual research survey. At the current level of 2,000t, actual index and survey removals are approximately one-half this level. The FRCC recognizes that not all fleets with access to this fishery actually participate to their fullest extent. In order to continue access and information flow at the current removals levels, the Council feels that the current level of Commercial Index survey should continue for the foreseeable future.

The FRCC recommends the established joint industry/science survey and the Index fishing program continue at a level not to exceed 2,000t per fishing year and that this level of harvest be fixed for two years during the 2003/2004 and 2004/2005 seasons.

The Council is disappointed with DFO's response to its repeated past recommendations on the issue of examining stock structure definition that "no such work will be carried out" due to a lack of funding. Such work is

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	50.6	55.6	55.6	56.6	57	57	57	67	60	30				No directed fishery				
Catch	35.1	38.4	43.4	51.9	55.2	63.8	68	77.4	51.8	19.8	0.02	0.02	0.02	0.30	1.05	1.14	1.05	1.2

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

thought to be essential to management of redfish. The information tabled through the Redfish Multidisciplinary Research Program and the repeated views of the Gulf of St. Lawrence fishing industry that the Units 1 and 2 should be considered as a single entity, requires that the current delineation of the stock be examined. The FRCC encourages the formation of a working group to deal specifically with this problem and to come to a resolution of redfish management area definitions by the end of the year 2003.

The FRCC recommends that a working group led by DFO Science including Fisheries Management and with input from stakeholders as appropriate be established:

- **To review and evaluate available information pertaining to stock definitions for redfish in management areas currently defined as Unit 1 and Unit 2;**
- **To consider all options for defining redfish management areas; and**
- **To determine the best approach to define redfish management areas based on the balance of all available information.**

The Redfish Multidisciplinary Research Program also concluded that the estimated predation by seals on redfish was significant. In particular, retrospective analyses to explain the substantial reduction of the redfish 1988 year-class did "identify seal predation (currently triple that of the 1970s) as an obvious direction for further investigation". The FRCC supports this work as further means of understanding all sources of mortality on redfish especially with regard to the apparent disappearance of the 1996, 1998, and 1999 year-classes.

The FRCC recommends that the work continue as a follow-up to the Redfish Multidisciplinary Research Program to provide annual estimates of the incidence of redfish consumption by seals throughout Unit 1.

While redfish by-catch in the shrimp fishery in Unit 1 has decreased since the implementation of the Nordmore grid, by-catch remains a source of concern for the FRCC. Even if the number is low in absolute terms, it may be significant with respect to the current status of the Unit 1 redfish biomass and may be an impediment to stock recovery. DFO response to this recommendation repeated in the past was to note that information from the observer program could be provided. The FRCC supports the collection and preparation of all such data.

The FRCC recommends that the monitoring of juvenile redfish by-catch in the shrimp fishery be continued and reported in future updates and assessments of this stock. This information will include observer data in the shrimp fisheries throughout Unit 1.

It was reported to the Council that work on Unit 1 and Unit 2 redfish stock status updates were displaced in 2002 by priority work in other DFO Science projects. The FRCC underlines the need to have a continual and consistent data flow that will be useful for understanding stock status and productivity for future rebuilding of the redfish stocks. Furthermore, the FRCC, in the interest of using all the information available from the joint industry/science survey and the Index fishing program, see considerable merit in developing a partnership with the industry to assist in the preparation and provision of DFO research documents and stock status updates. This information, including estimates on seals consumption of redfish, and the incidence of redfish caught in the shrimp fishery, should be provided annually as part of the redfish stock status update reports.

The FRCC recommends that DFO Science ensure the continuation of peer-reviewed annual redfish research documents and stock status information be provided to the FRCC and all stakeholders.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	50.6	55.6	55.6	56.6	57	57	57	67	60	30				No directed fishery				
Catch	35.1	38.4	43.4	51.9	55.2	63.8	68	77.4	51.8	19.8	0.02	0.02	0.02	0.30	1.05	1.14	1.05	1.2

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The FRCC recommends that DFO Science ensure the continuation of peer-reviewed annual redfish research documents and stock status information be provided to the FRCC and all stakeholders.

Sources

DFO Science

SSR A1-01 (2001) Status of Redfish Stocks in the Northwest Atlantic: Redfish in Units 1, 2, and in Division 3O

Summary of the State of the Stock in 2002 of Unit 1 Redfish (Gulf of St. Lawrence) – DFO Science presentation

FRCC Consultations

The FRCC held a public consultation on this stock in:

Bedford, NS (November 20)

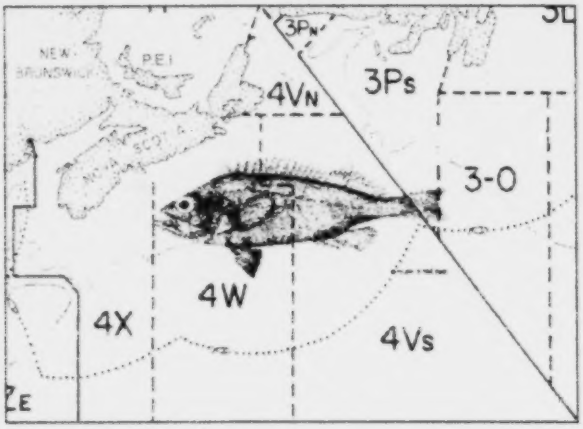
Written Briefs

Groundfish Enterprise Allocation Council – Bruce Chapman (2002-010-00216)

Council's Views on Stock Status

Overall Stock Condition:	stable at a low level
	Compared to average
Spawning Biomass:	stable at a low level
Total Biomass:	stable at a low level
Recruitment:	no significant recruitment since 1980 year-class
Growth and Condition:	average, similar to other redfish stocks
Age Structure:	poor
Distribution:	relatively restricted
Recent Exploitation Level:	low, approximately 2% of survey biomass
Natural Mortality:	may be higher than previously accounted for

REDFISH UNIT 2 - 3PS4VS4WFG+3PN4VN (JUN-DEC)



PERSPECTIVE

Redfish are long lived species with a relatively low fecundity and growth rate. This life history results in low productivity. In the North Atlantic, there are only 3 species of redfish (Sebastes spp.), and in Unit 2 the fishery is based primarily on *S. mentella* and *S. fasciatus*. For redfish, mature stock biomass is often supported by a relatively few strong year-classes, and in Unit 2 these have appeared about every ten years. However, *S. mentella* has not produced a strong year-class in 22 years, and in recent years the species contribution to these year-classes has changed, with recent year-classes dominated by *S. fasciatus*. The Unit 2 management area for this stock was implemented in 1993 and was previously managed as 3P redfish.

The stock continues to support a fishery. However, catches have been reduced in recent years as a consequence of overall stock decline. In November 1993, the Council recommended that the TAC for Unit 2 redfish be reduced from 28,000t to 25,000t for 1994. Since then the Council has been advising for lower TAC's in order to conserve the stock and provide the opportunity for rebuilding. The Council has also introduced small fish protocols and no fishing in 3Pn and 4Vn during an extended period of the year. The FRCC held public consultations on this stock in Harbour Breton, Sunnyside and Bedford in November and December 2002. Written comments were also received.

In previous years there were concerns about the high proportion of catch taken from the dominant 1980 year-class of *S. mentella*. The most recent science indicates that in 2001, 1988 and younger year-classes (predominantly *S. fasciatus*) constituted 18% by number and 10% by weight in the 3Ps fishery and 52% by number and 34% by weight in the 4V fishery. Overall the catch was 38% by number and 22% by weight of the 1988 and younger year-classes. From data available in 2002 the overall figures were respectively 28% by number and 15% by weight for year-classes 1988 and younger. Thus, there continues to be a focus on the 1980 year-class, which was predominantly of *S. mentella*. The species composition of this redfish Unit in earlier years is not currently know and it would be helpful to establish the relative contribution of the two main species.

The FRCC recommends that DFO science undertakes genetic studies based upon material adhering to archived otoliths, in order to identify the species mix of the large year-classes involved in the apparently more prolific earlier years of the fishery.

In 2000 industry representatives proposed a two-year approach to setting the TAC, i.e. reducing the TAC in 2001 to 9,000t and in 2002 to 8,000t. This proposal was in part to enable industry to begin to make operational adjustments. In 2002, an industry written brief advocated the continuation of the 8,000t TAC.

ANALYSIS

The FRCC notes with continuing dissatisfaction that the follow-up investigations to the Redfish Multidisciplinary Research Program recommended in 2000 had still not proceeded in 2002. These further investigations are necessary in order to have a firm foundation of information by which the redfish stocks, particularly in Units 1 and 2, may be managed.

The FRCC is disappointed with DFO's response to repeated recommendations to examine stock structure and responses that "no such work will be carried out". Such work is thought to be essential to management of redfish.

The FRCC recommends that a working group led by DFO Science including Fisheries Management and with input from stakeholders as appropriate be established:

- **To review and evaluate available information pertaining to stock definitions for redfish in management areas currently defined as Unit 1 and Unit 2;**
- **To consider all options for defining redfish management areas; and**

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	18	18	18	15	15	10	15	25	28	25	14	10	10	11	12	10	8	8
Catch	11.5	8.7	14	10.7	15.3	15.8	23.6	24.8	27	24.1	12.4	9.3	9.6	10.9	17.2	7.7	8.32	3.1

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

- **To determine the best approach to define redfish management areas based on the balance of all available information.**

The most recent DFO survey indicates a biomass index of the order of 250,000t which has remained rather stable since the series was initiated in 1994. Up to the most recent result in 2001, the GEAC survey also supports a picture of stability or slows a decline in the biomass. Both surveys consistently indicate the presence of both the 1980 and 1988 year-classes. The 1988 and 1994 year-classes now form 42% of the DFO 2002 survey abundance index. The 1988 year-class formed 44% of the GEAC 2001 survey abundance. Indications are that the 1988 year-class is not so abundant as the 1980 year-class which has supported the fishery for 12 years. Interestingly these year-classes (1980 and 1988 year-classes) are not present in the Gulf surveys since the collapse of the Unit 1 stock. The estimated exploitation rates in 2001-02 has been about 4% on the 1980 and about 3% on the 1988 year-classes. There appears to be recruitment to the stock from the 1994 and 1998 year-classes but the size of these is as yet uncertain. These year-classes will not contribute significantly to the fishery or the spawning stock for several years yet. The species composition of recent year-classes is predominantly *S. fasciatus* and the apparently poor recruitment of S. mentella remains a concern.

The FRCC reiterates the previous recommendation that fishing effort not focus on the 1980 year-class of *S. mentella*, but be distributed across the species and year-classes in rough proportion to the stock composition.

With a history of intermittent recruitment pulses of these slow growing species, it is to be expected that the adult biomass will fluctuate up and down in periodic cycles. Clearly these are species whose rational harvesting requires long term planning and it is therefore the intention of the FRCC to consult with industry and DFO on a Fisheries Resource Conservation Plan (FRCP) for Unit 2 redfish. These discussions will be facilitated if remaining questions of stock identity and mixing are first addressed urgently. Industry proposes a TAC of 8,000t in 2003-2004 on the basis of the continuing stability of biomass, SSB and catch-rates and the low exploitation rates on this Unit relatively to those on Unit 3. There is a need to develop an FRCP for redfish so that the remaining biomass of the 1980 year-class of *S. mentella* can be given the optimal opportunity to reproduce over the coming years. It may soon become necessary to progressively reduce the TAC until such time as recruitment of *S. mentella* occurs.

The FRCC recommends that the TAC for 2003/2004 remain at 8,000t but notes that this TAC may have to be reduced in following years if recruitment remains poor.

Council's Views on Stock Status

Overall Stock Condition:	stable
	Compared to average
Spawning Biomass:	stable
Total Biomass:	stable
Recruitment:	increasingly uncertain over actual strength of 1988 and 1994 year-classes
Growth and Condition:	average; similar to other redfish stocks
Age Structure:	moderate with respect to the total biomass; concern about the confirmed presence of only one significant year-class of *S. mentella*
Distribution:	good; similar to previous years
Recent Exploitation Level:	low

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
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Catch	11.5	9.7	14	10.7	15.3	15.8	23.8	24.8	27	24.1	12.4	9.3	9.8	10.9	17.2	7.7	8.32	3.1

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The most recent DFO survey indicates a biomass index of the order of 250,000t which has remained rather stable since the series was initiated in 1994. Up to the most recent result in 2001, the GEAC survey also supports a picture of stability or slows a decline in the biomass. Both surveys consistently indicate the presence of both the 1980 and 1988 year-classes. The 1988 and 1994 year-classes now form 42% of the DFO 2002 survey abundance index. The 1988 year-class formed 44% of the GEAC 2001 survey abundance. Indications are that the 1988 year-class is not so abundant as the 1980 year-class which has supported the fishery for 12 years. Interestingly these year-classes (1980 and 1988 year-classes) are not present in the Gulf surveys since the collapse of the Unit 1 stock. The estimated exploitation rates in 2001-02 has been about 4% on the 1980 and about 3% on the 1988 year-classes. There appears to be recruitment to the stock from the 1994 and 1998 year-classes but the size of these is as yet uncertain. These year-classes will not contribute significantly to the fishery or the spawning stock for several years yet. The species composition of recent year-classes is predominantly *S. fasciatus* and the apparently poor recruitment of S. mentella remains a concern.

The FRCC reiterates the previous recommendation that fishing effort not focus on the 1980 year-class of *S. mentella*, but be distributed across the species and year-classes in rough proportion to the stock composition.

With a history of intermittent recruitment pulses of these slow growing species, it is to be expected that the adult biomass will fluctuate up and down in periodic cycles. Clearly these are species whose rational harvesting requires long term planning and it is therefore the intention of the FRCC to consult with industry and DFO on a Fisheries Resource Conservation Plan (FRCP) for Unit 2 redfish. These discussions will be facilitated if remaining questions of stock identity and mixing are first addressed urgently. Industry proposes a TAC of 8,000t in 2003-2004 on the basis of the continuing stability of biomass, SSB and catch-rates and the low exploitation rates on this Unit relatively to those on Unit 3. There is a need to develop an FRCP for redfish so that the remaining biomass of the 1980 year-class of *S. mentella* can be given the optimal opportunity to reproduce over the coming years. It may soon become necessary to progressively reduce the TAC until such time as recruitment of *S. mentella* occurs.

The FRCC recommends that the TAC for 2003/2004 remain at 8,000t but notes that this TAC may have to be reduced in following years if recruitment remains poor.

Council's Views on Stock Status

Overall Stock Condition:	stable
	Compared to average
Spawning Biomass:	stable
Total Biomass:	stable
Recruitment:	increasingly uncertain over actual strength of 1988 and 1994 year-classes
Growth and Condition:	average; similar to other redfish stocks
Age Structure:	moderate with respect to the total biomass; concern about the confirmed presence of only one significant year-class of *S. mentella*
Distribution:	good; similar to previous years
Recent Exploitation Level:	low

Sources

DFO Science

SSR A1-01 (2001) Status of Redfish Stocks in the Northwest Atlantic: Redfish in Units 1, 2, and in Division 3O
Summary of the State of the Stock in 2002 of Unit 2 Redfish (Gulf of St. Lawrence) – DFO Science presentation

FRCC Consultations

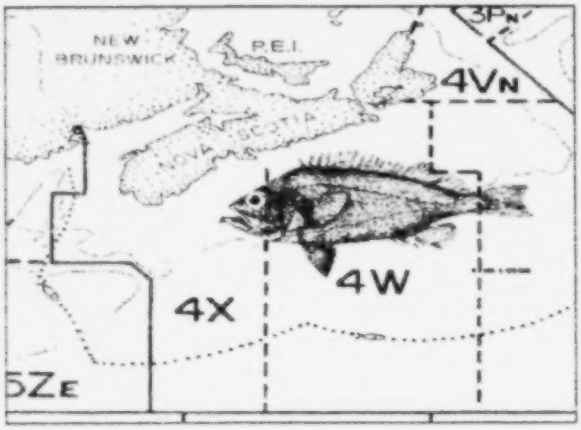
The FRCC held public consultations on this stock in:

Harbour Breton, NL (November 21)
Bedford, NS (November 20)
Sunnyside, NL (December 8)

Written Briefs

National Sea Products – Michael O'Connor (2002-010-00200)
National Sea Products – Michael O'Connor (2002-010-00208)
Scotia Fundy Mobile Gear Fishermen's Association (2002-010-00210)

REDFISH UNIT 3 - 4WDEHKLX



PERSPECTIVE

Redfish, also known as ocean perch, occur on both sides of the Atlantic Ocean. They are normally found along the slopes of fishing banks and deep channels usually at 100-700 m in water of 3-8 deg. C. The predominant species on the Scotian Shelf are *Sebastes fasciatus* (Acadian redfish), occuring in the deep basins and at the edge of the continental shelf, and *Sebates mentella* (beaked redfish) occuring in the deeper waters off the continental shelf. Recent genetic research results confirm that Unit 3 redfish are almost exclusively *S. fasciatus* and belong to a separate stock from *S. fasciatus* from Units 1 and 2. There is also a genetic separation between Scotian Shelf redfish and Gulf of Maine populations. While this genetic information provides important insights on stock structure, additional research is required, before its full implications are understood.

The Unit 3 management area (4Wdehkl X) for redfish was first implemented in the 1993 Groundfish Management Plan with a quota of 10,000t.

The TAC has been set at 10,000t for 1997 and 1998, down to 9,400t (15 months) in 1999, to 9,000t in 2000 where it has remained since. Some sectors do not catch their assigned quotas, usually resulting in total catches between 5,000-6,000t caught annually since 1980.

Consultations on Unit 3 redfish were held in Yarmouth and Bedford November 2002. At these consultations, the general perception of the stakeholders was that the stock was generally healthy. They identified a by-catch problem with undersize pollock, and indicated that the problematic capture of small redfish in some areas was being addressed by a joint industry/DFO initiative.

ANALYSIS

A Redfish Multidisciplinary Research Program has been conducted over recent years. This program has included a study of stock affiliations between and within current redfish management units. Unfortunately, follow up investigations which were to proceed in 2000 did not materialize. Stock Status Reports (SSR) and Updates continue to be developed on the basis of stock unit boundaries as they currently exist. The last formal assessment conducted on Unit 3 redfish was in 1999. The 1999 DFO Stock Status Report and the Updates since then indicate:

- Research vessel surveys are highly variable between years, showing no trend. The survey biomass underestimates the actual biomass on which the commercial fishery is based, as not all commercial sized fish are available to the survey gear, and the survey area does not provide a good sample of fish in waters deeper than 200 meters.
- The ITQ survey indicates abundance in 2002 similar to previous years
- Research Vessel surveys indicate improved recruitment in the late 1990s, but a decline in the last year may be early evidence that yield could decline in the medium term.
- The harvest rate is thought to be low and probably does not exceed the $F_{0.1}$ harvest rate of approximately 12%.
- The area fished has expanded since 1990 and has been relatively stable in recent years.
- The percentage of redfish under 22cm in the reported commercial catch has fluctuated between 9 and 13%.
- There is no biological or fishery basis to suggest a need for change in the management of the resource at this time.

The FRCC recommends that the TAC for 2003/2004 for Unit 3 Redfish continue to be set at 9,000t.

The FRCC also recommends that the DFO Fisheries Management and industry continue the process to address the two potential problems apparent in this fishery (1) the by-catch of other groundfish species while directing for redfish, and (2) the proportion of small redfish being caught.

Figures are in 000t

Year	1986	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC									10	10	10	10	10	10	10	9	9	9
Catch	6	6.7	6.2	3.9	3.3	2.4	1.9	2.5	4.8	5.1	4.8	4.7	6.2	5.80	5.20	5.1	4.8	3.5

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A1-01 (1999) Status of Redfish Stocks in the Northwest Atlantic: Redfish in Units 1, 2, and 3, and in Division 3O
SSR A3-35 (2000) Updates on Selected Scotian Shelf Groundfish Stocks in 2000
SSR A3-35 (2001) Updates on Selected Scotian Shelf Groundfish Stocks in 2001
SSR A3-35 (2002) Updates on Selected Scotian Shelf Groundfish Stocks in 2002

FRCC Consultations

The FRCC held public consultations on this stock in:

Yarmouth, NS (November 19)
Bedford, NS (November 20)

Written Briefs

Inshore Fisheries Limited – Claude d'Entremont (2002-010-00205)
Scotia Fundy Mobile Gear Fishermen's Association (2002-010-00210)
Charlesville Fisheries Ltd. – Raymond Belliveau (2002-010-00206)

Council's Views on Stock Status

Overall Stock Condition:	apparently stable
	Compared to average
Spawning Biomass:	uncertain but apparently stable
Total Biomass:	uncertain but apparently stable
Recruitment:	moderate; less intermittent than other redfish stocks, <22 cm declined recently
Growth and Condition:	average
Age Structure:	stable
Distribution:	harvest has shifted more towards the Gulf of Maine in recent years
Recent Exploitation Level:	uncertain

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC									10	10	10	10	10	10	10	9	9	9
Catch	6	6.7	6.2	3.9	3.3	2.4	1.9	2.5	4.8	5.1	4.8	4.7	6.2	5.80	5.20	5.1	4.8	3.5

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A1-01 (1999) Status of Redfish Stocks in the Northwest Atlantic: Redfish in Units 1, 2, and 3, and in Division 3O
SSR A3-35 (2000) Updates on Selected Scotian Shelf Groundfish Stocks in 2000
SSR A3-35 (2001) Updates on Selected Scotian Shelf Groundfish Stocks in 2001
SSR A3-35 (2002) Updates on Selected Scotian Shelf Groundfish Stocks in 2002

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Spawning Biomass:	uncertain but apparently stable
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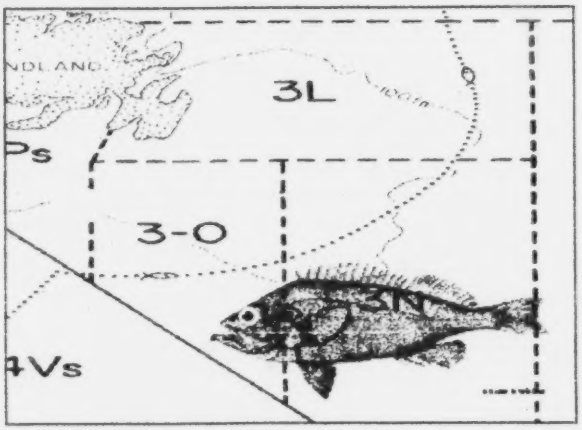
Recruitment:	moderate; less intermittent than other redfish stocks, <22 cm declined recently
Growth and Condition:	average
Age Structure:	stable
Distribution:	harvest has shifted more towards the Gulf of Maine in recent years
Recent Exploitation Level:	uncertain

REDFISH - 3O



PERSPECTIVE

Redfish is a long lived species with a relatively low fecundity rate. The mature stock biomass is supported by few strong year classes, usually appearing about every ten years. The redfish stock in 3O is heavily exploited before year classes reach sexual maturity. In addition there is an increasing exploitation on the stock by foreign fleets fishing outside the 200 mile limit. This foreign fishery is unregulated and in recent years the TAC has been exceeded.

In November 1993, the Council recommended reduction of the TAC to 10,000t for 1994. The Council later recommended that a small fish protocol be established to protect juvenile redfish and that research be accelerated to determine the origin of the small fish found in this Division.

Public consultations were held in Harbour Breton and Sunnyside in November and December, 2002. No comments were received on 3O redfish.

ANALYSIS

The 2001 DFO Stock Status Report indicated that:

- About 10% of the stock area lies outside Canada's 200 mile Exclusive Economic Zone (EEZ) and is subject to unregulated fishing.
- The 2001 survey information for both Spring and autumn continues to indicate that stock status has not improved and may be declining somewhat.
- The 2001 autumn survey detected two pulses or recruitment to the stock, corresponding to the 1996 and 1999 year classes. Further monitoring will be required to continue the relative strengths of these year classes.
- Recent survey results suggest that catches of about 10,000 tons per year are sustainable.
- It is still not possible to describe overall trends in total stock size or to estimate the current size of the fishable portion of the population, not is it possible to determine current fishing mortality rate.

The Council notes that biomass estimates of this stock are uncertain due to limitations on survey data, such as the inability to catch redfish at smaller sizes (although this has not been problematic in other areas) and also at sizes beyond 30 cm. Because of this uncertainty regarding overall trends in absolute stock size and estimating the current fishable portion of the biomass, current fishing mortality rates cannot be determined.

The Council also notes that the most appropriate long term exploitation strategy for this stock needs to be considered within the context of the pattern of recruitment for redfish stocks and the capabilities of science and industry to monitor and quantify changes in stock size and characteristics.

Finally, it is noted that recent genetic studies serve to dispel speculation that there is a relationship between the prescence of predominately small redfish in this area and the stocks of other areas. It is important that the results of these studies be confirmed.

Reflecting on the advice of the scientists, and observing that an annual catch in the range of 10,000t remains within the longer term average for this stock, it is concluded that there is no basis to adjust the current approach to fishing mortality. Having noted this, the Council observes that unregulated catches of vessels outside Canada's 200 mile zone have been increasing in recent years. If this trend continues, and if the Canadian fleet catches its available quota, this stock will be vulnerable to overexploitation.

The FRCC recommends that the TAC for 2003/2004 for 30 redfish be set at 10,000t.

The Council observes that the renewed interest the foreign fleets have taken in this resource outside 200 miles in the unregulated fishery appears to be continuing. It seems likely that the total catch will continue to exceed the established TAC for 3O redfish. Given this

Figures are in 000t

Year	1986	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	20	20	20	14	14	14	14	14	14	10	10	10	10	10	10	10	10	10
Catch	12.9	11.1	13.2	11.2	11	9	7.6	20.8	13.1	4.4	2.8	9	4.7	9.1	12.5	12.80	12	2.8

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

trend the currently recruiting year class is increasingly vulnerable to over-exploitation.

The FRCC recommends that DFO develop an effective plan to bring fishing effort on 3O Redfish under control outside 200 miles.

The Council recognizes the recent implementation of the small fish monitoring and reporting system to address the well documented pattern of landing small redfish from this management unit, and feels that this initiative must be continued in future years.

The FRCC recommends that the small fish protocol be applied to all fleets harvesting the resource throughout the range of the stock, and that it be rigorously enforced.

Sources

DFO Science

A1-01 (2001) Status of Redfish Stocks in the Northwest Atlantic: Redfish in Units 1, 2, and in Division 3O

FRCC Consultations

The FRCC held public consultations on this stock in:

Harbour Breton, NL (November 21)
Sunnyside, NL (December 8)

Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Condition:	stable
	Compared to average
Spawning Biomass:	uncertain
Total Biomass:	may decline
Recruitment:	good, may decline
Growth and Condition:	uncertain
Age Structure:	uncertain
Distribution:	unchanged
Recent Exploitation:	uncertain

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	20	20	20	14	14	14	14	14	14	10	10	10	10	10	10	10	10	10
Catch	12.9	11.1	13.2	11.2	11	9	7.6	20.6	13.1	4.4	2.8	9	4.7	9.1	12.5	12.80	12	2.8

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

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FRCC Consultations

The FRCC held public consultations on this stock in:

Harbour Breton, NL (November 21)
Sunnyside, NL (December 8)

Written Briefs

No briefs received

Council's Views on Stock Status

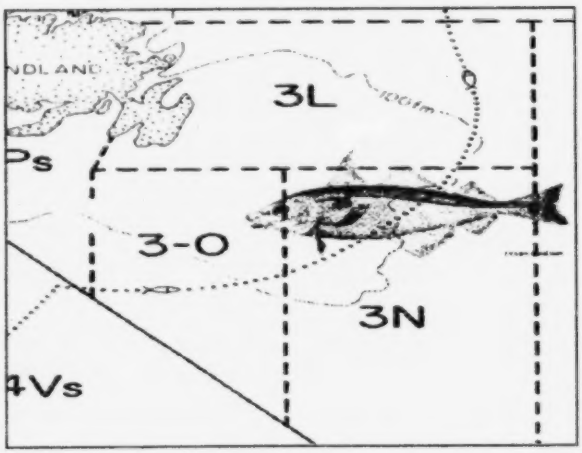
Overall Stock Condition: stable

Compared to average

Spawning Biomass:	uncertain
Total Biomass:	may decline
Recruitment:	good, may decline
Growth and Condition:	uncertain
Age Structure:	uncertain
Distribution:	unchanged
Recent Exploitation:	uncertain

Chapter 4: Newfoundland Groundfish Stocks, Stock-by-Stock Recommendations

HADDOCK - 3LNO



PERSPECTIVE

Haddock is a bottom-dwelling species that feeds mainly on small invertebrates. Historically, the Grand Banks haddock stock was one of the most dominant species in the area. The stock was very heavily exploited by trawlers in the 1960-70's and during this period, the stock collapsed. The stock has remained at a relatively low level up to present.

The FRCC held public consultations on this stock in Harbour Breton and Sunnyside in November and December 2002. Comments referenced the high abundance of this stock historically and the need to rebuild the stock in the context of an ecosystem approach.

In November 1993, the Council recommended that removals be limited to a by-catch fishery. In order to prevent a repeat of the heavy exploitation that was exerted in the mid-1980s on the 1980 and 1981 year-classes, the Council recommended that there be no directed fishing for the 3LNO haddock stock in 1994 and that by-catches be limited to 500t. In 1995 the FRCC recommended reducing the by-catch limit to 100t. Since 1998, the Council recommended continuation of the prohibition on directed fishing and that restrictive by-catch protocols be applied when prosecuting other fisheries.

ANALYSIS

There was no new scientific information available in 2002. The 2000 DFO Newfoundland Region Groundfish Overview indicated that:

- The 1998 year class may be strong, but the significance of this year class is unknown.
- If the current moratorium on cod and plaice continues and mesh size and by-catch regulations in the yellowtail fishery are adhered to, fishing pressure on the 1998 year-class should be low.
- Haddock abundance in 3LNO was low throughout the 1970s, higher in 1984-1988, and subsequently low.

There is no new information available from the most recent research vessel survey. Fish that reach spawning age must be protected if recruitment is to improve in the future for this stock.

The FRCC recommends that there be no directed fishing for 3LNO haddock in 2003/2004 and that there be a restrictive by-catch fishery only.

Information from 1998, 1999 and 2000 surveys suggest the possibility of a good 1998 year-class. Given that this used to be a major fishery until the 1960s, the Council believes that measures must be adopted to protect this year-class. It is believed that the current NAFO moratorium on various stocks in this area, as well as restrictions on the 3LNO yellowtail fishery, will assist in the protection of this year-class.

The FRCC recommends that DFO Fisheries Management monitor closely the by-catch of 3LNO haddock and establish management protocols to ensure fishing mortality is minimized on the 1998 year-class.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	–	–	4.1	8.1	8.1	10	4.1	4.1					No directed fishery					
Catch	4	7.8	5.7	8.1	8.1	3.1	1.1	0.9	0.8	0.01	0.022	0.09	0.33	0.31	0.09	0.06	0.17	0.19

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Council's Views on Stock Status

Overall Stock Indicator:	low
	Compared to average
Spawning Biomass:	low
Total Biomass:	low
Recruitment:	production of young haddock has been poor since 1980-81 but indications from the 1998-2000 surveys suggest improvement
Growth and Condition:	not available
Age Structure:	unknown
Distribution:	unknown
Recent Exploitation Level:	unknown; fishing pressure likely reduced due to moratoria on cod and flatfish, and to reduced by-catch limits

Sources

DFO Science

SSR A2-19 (2000) Newfoundland Region Groundfish Overview

FRCC Consultations

The FRCC held public consultations on this stock in:

Harbour Breton, NL (November 21)
Sunnyside, NL (December 8)

Written Briefs

No briefs received

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	–	–	4.1	8.1	8.1	10	4.1	4.1					No directed fishery					
Catch	4	7.8	5.7	8.1	6.1	3.1	1.1	0.9	0.8	0.01	0.022	0.09	0.33	0.31	0.09	0.06	0.17	0.19

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A2-19 (2000) Newfoundland Region Groundfish Overview

FRCC Consultations

The FRCC held public consultations on this stock in:

Harbour Breton, NL (November 21)
Sunnyside, NL (December 8)

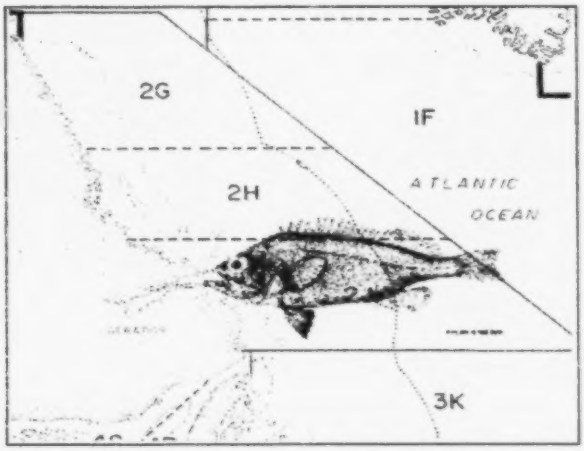
Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	low
	Compared to average
Spawning Biomass:	low
Total Biomass:	low
Recruitment:	production of young haddock has been poor since 1980-81 but indications from the 1998-2000 surveys suggest improvement
Growth and Condition:	not available
Age Structure:	unknown
Distribution:	unknown
Recent Exploitation Level:	unknown; fishing pressure likely reduced due to moratoria on cod and flatfish, and to reduced by-catch limits

REDFISH - 2+3K



PERSPECTIVE

Redfish is a long-lived species with relatively low fecundity. The spawning stock biomass that supports a fishery is comprised of generally few strong year-classes. These year-classes usually appear one in each decade.

In 1993, the Council observed that, given the very low level of this stock, the TAC of 20,000t was too high and recommended, as a precautionary measure, that the 1994 TAC for the 2+3K redfish stock be set at 1,000t. Since 1995, the Council has recommended that any directed fishery, should it be allowed, be carried out within the framework of a scientifically coordinated test fishery and that a nominal amount of 200t be provided for that purpose.

The FRCC held public consultations on this stock in St. Anthony, Twillingate, Sunnyside and Bedford in November and December 2002. Stakeholders indicated that there is possible linkage between 1F and 2+3K redfish and that a limited quota should be established to conduct a study of the area.

ANALYSIS

The 2001 DFO Science Stock Status Report indicated:

- DFO surveys continue to indicate the resource is at a very low level with poor recruitment for the past 25 years.
- Stock structure is poorly understood, particularly the relationship between redfish in SA2+Div. 3K and those in Davis Strait and the Irminger Sea pelagic stock.

Although there are early indications of pulses in certain year-classes, recruitment would require a minimum of 10 years before it would contribute to any fishery. No directed commercial fishing on this stock is therefore justified.

The FRCC recommends that there be no directed fishing of 2+3K redfish in 2003/2004 and that there be a restrictive by-catch fishery only.

The FRCC recommends that a scientifically based test fishery of up to 200t be established to provide further data on the redfish in the area and its possible linkage to redfish in 1F.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	35	35	35	35	35	35	20	20	20	1	0.2	0.2			No directed fishery			
Catch	31.5	30.3	20.8	8.9	3.3	2.4	0.8	0.02	0.05	0.01	0	0	0.002	0.003	0.002	0.018	0.027	0.021

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A2-15 (2001) SA2+Div. 3K Redfish

FRCC Consultations

The FRCC held public consultations on this stock in:

St. Anthony, NL (November 19)
Twillingate, NL (November 20)
Bedford, NS (November 20)
Sunnyside, NL (December 8)

Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	extremely low
	Compared to average
Spawning Biomass:	very low
Total Biomass:	very low; less than 10% of 1978-90 average estimate
Recruitment:	very poor
Growth and Condition:	not available
Age Structure:	unknown
Distribution:	unknown
Recent Exploitation Level:	low

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	35	35	35	35	35	35	20	20	20	1	0.2	0.2			No directed fishery			
Catch	31.5	30.3	20.8	6.9	3.3	2.4	2.6	0.02	0.06	0.01	0	0	0.002	0.003	0.002	0.016	0.027	0.021

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A2-15 (2001) SA2+Div. 3K Redfish

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The FRCC held public consultations on this stock in:

St. Anthony, NL (November 19)
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Written Briefs

No briefs received

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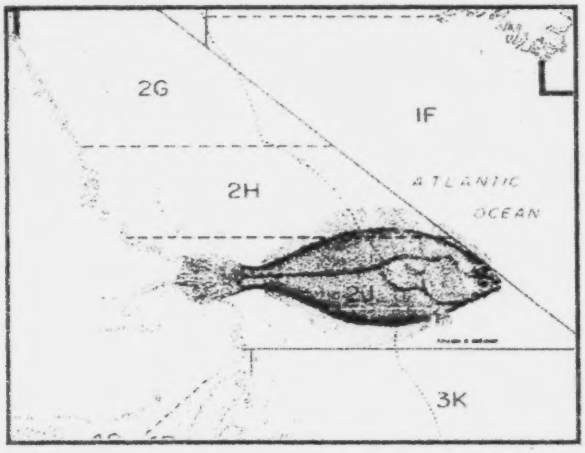
American Plaice - 2+3K



Perspective

American plaice are a bottom-dwelling fish that are primarily associated with mud and sand bottoms. Like other flatfishes found along the Atlantic coast they are asymmetrical, both eyes lying on one side of a highly flattened body. Plaice lie on the bottom on their blind side. Their principal food include crustaceans, molluscs, and small fishes. The stock in 2+3K has declined sharply during the past decade despite no fishing pressure. It is generally thought that this decline is related to poor environmental conditions for plaice over the stock area.

In November 1993, the Council noted that the spawning biomass was far below any previous level and that there were no signs of good recruitment for this stock. Since this time, the Council has recommended that there be no directed fishing for 2+3K American plaice and that by-catches be limited.

The FRCC held public consultations on this stock in St. Anthony, Twillingate and Sunnyside during November and December 2002. There were no stakeholder comments on this stock.

Analysis

There was no new scientific information available in 2002. The 2000 Stock Status Report (SSR) indicated:

- Biomass has remained low since 1992 and is currently estimated to be about 6% of the 1980-84 average.
- Estimates of seal consumption is about 15,000t of American plaice in 2J3KL.
- In recent years recruitment has been low.
- Estimates of total mortality are greater than 0.7 despite low catches.
- Little prospect of recovery in the foreseeable future.

The FRCC recommends that there be no directed fishing for 2+3K American plaice during 2003/2004 and that there be a restrictive by-catch fishery only.

The FRCC recommends that co-operative science-industry surveys be developed to increase the data base for this stock.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	10	10	10	10	10	10	10	10	5	No directed fishery								
Catch	0.8	3	1	0.9	4.1	1.8	0.5	0.07	0.01	0.01	0.02	0.006	0.006	0.008	0.007	0.05	0.1	0.013

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A2-11 (2000) American plaice in Subarea 2 and Division 3K

FRCC Consultations

The FRCC held public consultations on this stock in:

St. Anthony, NL (November 19)
Twillingate, NL (November 20)
Sunnyside, NL (December 8)

Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	very low
	Compared to average
Spawning Biomass:	very low
Total Biomass:	very low; recent estimates only 6% of early 1980s
Recruitment:	poor
Growth and Condition:	not available
Age Structure:	gradual reduction in number of older fish; all age groups depressed
Distribution:	moved to deeper water in late 1980s
Recent Exploitation Level:	low; by-catch only

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	10	10	10	10	10	10	10	10	5				No directed fishery					
Catch	0.8	3	1	0.9	4.1	1.8	0.5	0.07	0.01	0.01	0.02	0.006	0.006	0.006	0.007	0.06	0.1	0.013

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A2-11 (2000) American plaice in Subarea 2 and Division 3K

FRCC Consultations

The FRCC held public consultations on this stock in:

St. Anthony, NL (November 19)
Twillingate, NL (November 20)
Sunnyside, NL (December 8)

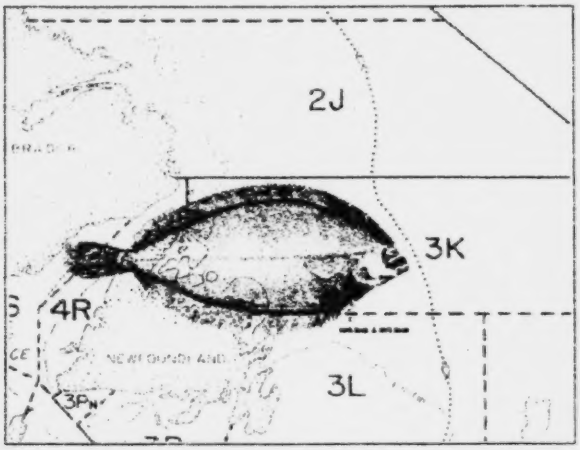
Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	very low
	Compared to average
Spawning Biomass:	very low
Total Biomass:	very low; recent estimates only 6% of early 1980s
Recruitment:	poor
Growth and Condition:	not available
Age Structure:	gradual reduction in number of older fish; all age groups depressed
Distribution:	moved to deeper water in late 1980s
Recent Exploitation Level:	low; by-catch only

WITCH FLOUNDER - 2J3KL



PERSPECTIVE

Witch are a bottom-dwelling fish that are primarily associated with mud bottom. Like other flatfishes found along the Atlantic coast they are asymmetrical, both eyes lying on one side of a highly flattened body. Witch inhabit the deep slope waters along the northern shelf of the 2J3KL areas. The stock has declined sharply during the past decade as a result of over exploitation and is currently at a very low level. Evidence indicates that the stock has migrated into the 3M area and is exposed to fishing pressure in the deep waters of the Flemish Pass.

In 1993, the Council noted that the biomass of witch flounder in 2J3KL was far below any previous estimate in the 15-year time series, and consequently recommended that, as a precautionary measure, the TAC be reduced to 1,000t. Since 1994, the Council has recommended that there be no directed fishing for the stock and that by-catches be limited.

The FRCC held public consultations on this stock in St. Anthony, Twillingate and Sunnyside in November and December 2002. No stakeholder comments were received on this stock.

ANALYSIS

The 2001 Report of the NAFO Scientific Council indicated that:

- This stock remains at a very low level.
- There are some indications of movement to deeper waters of 3L.

Witch is a slow-growing species that may live to 30 years. Age groups in the 2J3KL stock have been reduced substantially since the 1970s. There are fewer older fish now. Fishing has generally taken fish from pre-spawning and spawning concentrations. Recently, witch appears to have moved to deeper water (in excess of 900m). Data on this stock indicate that it has dramatically declined since the 1980s; relative biomass in 1994 was estimated to be 4% of the 1986 level. Research surveys in 1996 found that witch was somewhat more abundant in the Flemish Pass area which could make it vulnerable to by-catch in the turbot fishery outside 200 miles and may have migrated from Canadian waters. Generally, the stock is at the lowest level ever observed and there are no signs of improving recruitment. The shrinking area of distribution of this stock, despite its low biomass, may increase its vulnerability to fishing.

The FRCC recommends that there be no directed fishing for 2J3KL witch flounder in 2003/2004 and that there be a restrictive by-catch fishery only.

The FRCC recommends that Canada seek to implement, within NAFO, a moratorium on directing for witch flounder in area 3M.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	6	6	6	5	5	4	4	4	4	1				No directed fishery				
Catch	3	3.9	4.6	3.9	4.9	3.9	4	2.6	0.4	0.8	1.3	1.7	1.2	1.1	0.38	0.39	0.4	0.05

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

NAFO

NAFO Scientific Council Reports - 2001

FRCC Consultations

The FRCC held public consultations on this stock in:

St. Anthony, NL (November 19)
Twillingate, NL (November 20)
Sunnyside, NL (December 8)

Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	very low
	Compared to average
Spawning Biomass:	very low
Total Biomass:	very low
Recruitment:	poor; no signs of improvement
Growth and Condition:	not available
Age Structure:	not available
Distribution:	shrinking; may have migrated to deeper waters in early 1990s
Recent Exploitation Level:	appears low, however, if the stock has migrated to deeper waters outside the Canadian zone, it could be vulnerable to unregulated fishing

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	8	8	6	5	5	4	4	4	4	1				No directed fishery				
Catch	3	3.9	4.5	3.9	4.9	3.9	4	2.6	0.4	0.6	1.3	1.7	1.2	1.1	0.36	0.39	0.4	0.05

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

NAFO

NAFO Scientific Council Reports - 2001

FRCC Consultations

The FRCC held public consultations on this stock in:

St. Anthony, NL (November 19)
Twillingate, NL (November 20)
Sunnyside NL (December 8)

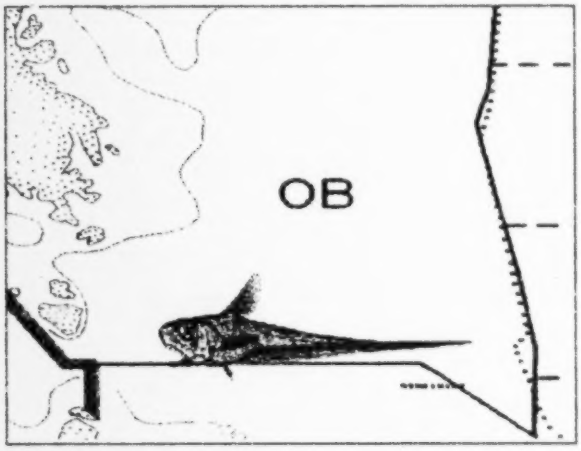
Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	very low
	Compared to average
Spawning Biomass:	very low
Total Biomass:	very low
Recruitment:	poor; no signs of improvement
Growth and Condition:	not available
Age Structure:	not available
Distribution:	shrinking; may have migrated to deeper waters in early 1990s
Recent Exploitation Level:	appears low, however, if the stock has migrated to deeper waters outside the Canadian zone, it could be vulnerable to unregulated fishing

ROUNDNOSE GRENADIER - SUBAREA 0



PERSPECTIVE

Grenadier are a deep water species that occur off the slopes of the northern part of the Grand Bank north-ward to the Davis Strait. The stock has been over-exploited in recent decades and has remained at a very low level of abundance over the past decade. In 1993 the Council recommended the TAC for Subarea 0 roundnose grenadier be set at 3,000t. The Council recommended in 1995 that there be no directed fishery on this stock and cooperative industry-science surveys should be encouraged.

The FRCC held public consultations on this stock in St. Anthony and Twillingate in November 2002. No stakeholder comments were received on this stock.

ANALYSIS

The NAFO Scientific Council Report notes that the stock found in the Davis Strait is probably connected to the other stocks in the North Atlantic. The stock component found in Subarea 0 +1 is at the margin of the distribution area. Previous Canadian and Russian surveys showed that most of the biomass was generally found in Subarea 1. The exploitation level is considered to be low in recent years and the stock seems to be at very low levels. The Scientific Council recommends that there be no directed fishing.

The FRCC recommends that there be no directed fishing for roundnose grenadier in Subarea 0 in 2003/2004 and that there be a restrictive by-catch fishery only.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	4	4	4	4	4	4	4	4	4	4	1	No directed fishery						
Catch	0.2	0.008	0.01	0.5	0.08	0.29	0.19	0.11	0.05	0	0	0	0.002	0	0	0.005	0.01	0

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

NAFO

NAFO Scientific Council Reports - 2000

FRCC Consultations

The FRCC held public consultations on this stock in:

St. Anthony, NL (November19)
Twillingate, NL (November 20)

Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	very low
	Compared to average
Spawning Biomass:	likely low (unspecified)
Total Biomass:	very low
Recruitment:	not available
Growth and Condition:	not available
Age Structure:	not available
Distribution:	unknown
Recent Exploitation Level:	low

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	4	4	4	4	4	4	4	4	4	4	1					No directed fishery		
Catch	0.2	0.008	0.01	0.5	0.08	0.29	0.19	0.11	0.05	0	0	0	0.002	0	0	0.003	0.01	0

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

NAFO

NAFO Scientific Council Reports - 2000

FRCC Consultations

The FRCC held public consultations on this stock in:

St. Anthony, NL (November19)
Twillingate, NL (November 20)

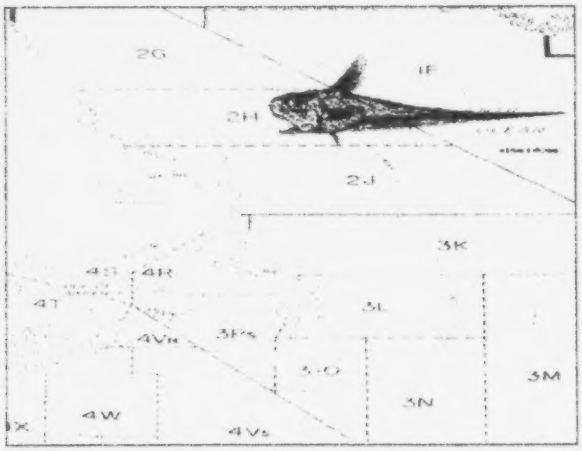
Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	very low
	Compared to average
Spawning Biomass:	likely low (unspecified)
Total Biomass:	very low
Recruitment:	not available
Growth and Condition:	not available
Age Structure:	not available
Distribution:	unknown
Recent Exploitation Level:	low

ROUNDNOSE GRENADIER - 2+3



PERSPECTIVE

Grenadier are a deep water species that occur off the slopes of the northern part of the Grand Bank northward to the Davis Strait. The stock has been over-exploited in recent decades and has remained at a very low level of abundance over the past decade. In 1993 the Council recommended that the TAC for roundnose grenadier be set at 4,000t. This TAC was reduced to 500t in 1995 and in 1997 the FRCC recommended there be no directed fishing on roundnose grenadier in Subarea 2+3.

The FRCC held public consultations on this stock in St. Anthony, Twillingate, Harbour Breton and Sunnyside during November and December 2002. No stakeholder comments were received on this stock.

ANALYSIS

The most recent report of the NAFO Scientific Council Report notes that due to limited data it is not possible to determine the state of the stock and was therefore not able to provide any advice.

The FRCC recommends that there be no directed fishing for roundnose grenadier in 2+3 in 2003/2004 and that there be a restrictive by-catch fishery only.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	11	11	11	11	11	11	11	11	11	3	3	1			No directed fishery			
Catch	4.9	7.4	6.3	6.3	4.9	3.9	5	7	4.4	4	4	4.2	3.5	0.12	0.23	0.2	0.16	0.17

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

NAFO

NAFO Scientific Council Report 2000

FRCC Consultations

The FRCC held public consultations on this stock in:

St. Anthony, NL (November 19)
Twillingate, NL (November 20)
Harbour Breton, NL (November 21)
Sunnyside, NL (December 8)

Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	unknown
	Compared to average
Spawning Biomass:	unknown
Total Biomass:	unknown
Recruitment:	unknown
Growth and Condition:	unknown
Age Structure:	unknown
Distribution:	unknown
Recent Exploitation Level:	unknown

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	11	11	11	11	11	11	11	11	11	3	3	1			No directed fishery			
Catch	4.9	7.4	8.3	8.3	4.9	3.9	5	7	4.4	4	4	4.2	3.5	0.12	0.23	0.2	0.16	0.17

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

NAFO

NAFO Scientific Council Report 2000

FRCC Consultations

The FRCC held public consultations on this stock in:

St. Anthony, NL (November 19)
Twillingate, NL (November 20)
Harbour Breton, NL (November 21)
Sunnyside, NL (December 8)

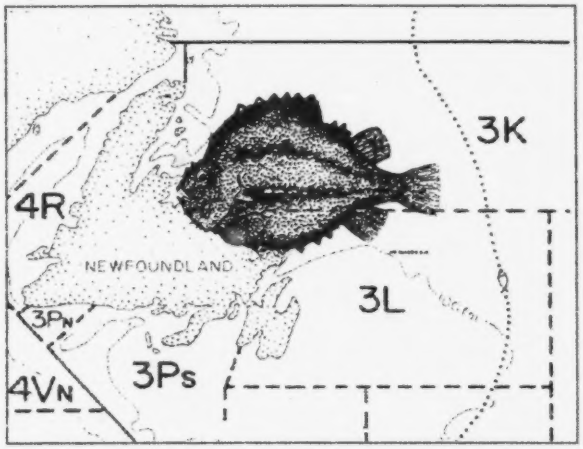
Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	unknown
	Compared to average
Spawning Biomass:	unknown
Total Biomass:	unknown
Recruitment:	unknown
Growth and Condition:	unknown
Age Structure:	unknown
Distribution:	unknown
Recent Exploitation Level:	unknown

LUMPFISH



PERSPECTIVE

Lumpfish are harvested in the coastal waters of Newfoundland and the fishery has been managed under an effort system that limits fishing seasons and gear within defined coastal zones. There is little scientific knowledge on the resource and no specific research is conducted on the stock.

The FRCC first reported on this stock in 1995. The Council recommended that management measures, such as shortened season, be used to reduce the effort on this stock. In October 1996, the Council recommended that new management measures be taken to ensure conservation of lumpfish and that these measures include a combination of the following:

- Roe content monitoring programs should be established to determine timing of the fishery to maximize yield/fish.
- Closed and protected spawning areas must be established throughout the range of the stock. More localized management must be established.
- Low effort must be maintained.
- Gear limits and the shortened season should be maintained. Since 1998 the Council re-iterated that fishers and Science gather more specific information on this stock through an Index Fisherman Program.

The FRCC held public consultations on this stock in St. Anthony, Twillingate, Harbour Breton and Sunnyside during November and December 2002.

ANALYSIS

There was new scientific information available on the 3P portion of the stock in the form of a Stock Status Report (SSR) in 2001. The 2002 SSR indicates that:

- Due to an overall lack of data, it is impossible to determine the current status of this stock.
- Surveys are not useful in evaluating this resource due to relative inshore distribution of the stock compared to survey coverage.

Lumpfish males establish breeding territories inshore; these may be used year after year. Data from studies which have monitored these territories indicate exceptional impact from the fishery. The lumpfish fishery is exclusively on pre-spawning mature females and therefore the spawning stock is vulnerable to over exploitation. Since the cod moratorium, there has been an increase in fishers entering this fishery. Research vessel surveys are not considered to be representative of the stock due to the seasonal migratory pattern of this species. There is insufficient new data to determine the status of this resource.

The FRCC recommends that measures taken to control effort in the past few years be continued.

The FRCC also notes that the inshore nature of this stock lends itself to more local community-based research.

The FRCC recommends that fishers and managers assess their local stocks and implement appropriate conservation measures in agreement with the local stock status, e.g., full closures, rotating local closures, shortening seasons, effort reductions, and the Department provide the Council with the fishery status by these local areas at the end of the season.

Since this fishery is very localized, the FRCC believes that programs be encouraged with local fishermen to get data on the stock. Consequently, the FRCC continues to repeat the recommendation below.

The FRCC recommends that fishers and science gather more information on this stock through the establishment of an Index Fishermen Program especially with respect to: catch and effort levels, spawning patterns, growth rates, maturation, population structure, temperature preferences

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC																		
Catch	1	1.5	4	3.3	2.3	1.2	2.1	1.9	2.4	1.8	1.2	1.5	2.29	1.1	2.2			

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

and habitat preferences. Further recommendations for continuation of this fishery are incumbent upon information of this nature being provided to the Council.

Sources

DFO Science

SSR A2-17 (2001) Lumpfish in NAFO Division 3P
SSR A2-17 (2002) Lumpfish in NAFO Division 3P

FRCC Consultations

The FRCC held public consultations on this stock in:

St. Anthony, NL (November 19)
Twillingate, NL (November 20)
Harbour Breton, NL (November 21)
Sunnyside, NL (December 8)

Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	unknown
	Compared to average
Spawning Biomass:	unknown
Total Biomass:	unknown
Recruitment:	unknown
Growth and Condition:	not available
Age Structure:	fishery is exclusively on mature females before spawning
Distribution:	seasonal migratory patterns; fishing concentrated on in-shore spawning areas
Recent Exploitation Level:	fishery regulated by effort; number of participants in fishery increased since cod moratorium; number of nets allowed and duration of fishery have been reduced in recent years

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC																		
Catch	1	1.5	4	3.3	2.3	1.2	2.1	1.9	2.4	1.5	1.2	1.5	2.26	1.1	2.2			

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

and habitat preferences. Further recommendations for continuation of this fishery are incumbent upon information of this nature being provided to the Council.

Sources

DFO Science

SSR A2-17 (2001) Lumpfish in NAFO Division 3P
SSR A2-17 (2002) Lumpfish in NAFO Division 3P

FRCC Consultations

The FRCC held public consultations on this stock in:

St. Anthony, NL (November 19)
Twillingate, NL (November 20)
Harbour Breton, NL (November 21)
Sunnyside, NL (December 8)

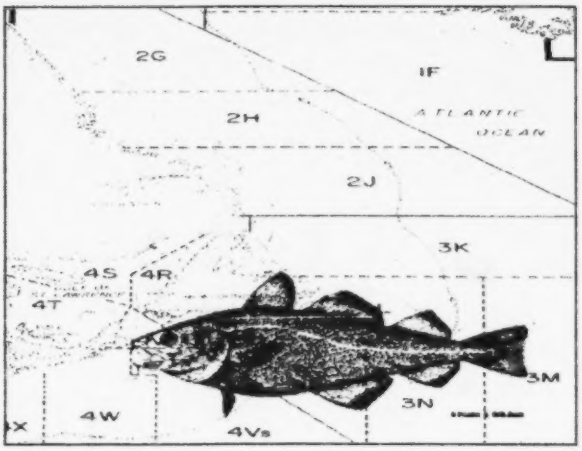
Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	unknown
	Compared to average
Spawning Biomass:	unknown
Total Biomass:	unknown
Recruitment:	unknown
Growth and Condition:	not available
Age Structure:	fishery is exclusively on mature females before spawning
Distribution:	seasonal migratory patterns; fishing concentrated on in-shore spawning areas
Recent Exploitation Level:	fishery regulated by effort; number of participants in fishery increased since cod moratorium; number of nets allowed and duration of fishery have been reduced in recent years

COD - 2GH



- The surveys conducted from 1996-1998 detected very few fish and in 2000 the 2G component of the survey was dropped and 2H is to be surveyed in alternating years.
- The status remains unknown but abundance is assumed low.

There is very limited information on this stock. The shrimp fishery in the area uses the Nordmore grate which reduces the capture of this species.

The FRCC recommends that there be no directed fishing for 2GH cod in 2003/2004 and that there be a restrictive by-catch fishery only.

PERSPECTIVE

Cod are the dominant groundfish species throughout most of the waters of Atlantic Canada. Cod inhabit waters from the inshore coastal areas to the deeper waters to the edge of the continental shelf. Cod in area 2GH generally grow relatively slowly as they are at the northern most extent of their range in this area. Cod feed mainly on capelin and other small fishes in this area. The abundance of cod in this area has been very low for about two decades following very high exploitation by the fishery in the decades of the 60's and 70's.

In 1993, the Council recommended that the TAC for 2GH cod be set at 1,000t as a precautionary measure and since 1996 the FRCC has recommended no directed fishing take place on this stock and cooperative industry science surveys should be encouraged.

The FRCC held public consultations on this stock in St. Anthony, Twillingate and Sunnyside in November and December 2002. No stakeholder comments were received on this stock.

ANALYSIS

There was no new scientific information available in 2002. The 2000 DFO Newfoundland Region Groundfish Overview indicated that:

- There has been no reported catch of 2GH cod since 1991.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03
TAC	20	20	20	20	20	20	20	20	1	1	0.2	0.2	No directed fishery					
Catch	0.64	0.8	0.13	0.4	0.43	0.23	0	0	0	0	0	0	0	0	0	0	0	0

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

Sources

DFO Science

SSR A2-19 (2000) Newfoundland Region Groundfish Overview

FRCC Consultations

The FRCC held public consultations on this stock in:

St. Anthony, NL (November 19)
Twillingate, NL (November 20)
Sunnyside, NL (December 8)

Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator: :	very low, status unknown
	Compared to average
Spawning Biomass:	unknown
Total Biomass:	unknown
Recruitment:	unknown
Growth and Condition:	unknown
Age Structure:	unknown
Distribution:	unknown
Recent Exploitation Level:	none - no fishery

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03
TAC	20	20	20	20	20	20	20	20	1	1	0.2	0.2			No directed fishery			
Catch	0.54	0.5	0.13	0.4	0.43	0.23	0	0	0	0	0	0	0	0	0	0	0	0

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

Sources

DFO Science

SSR A2-19 (2000) Newfoundland Region Groundfish Overview

FRCC Consultations

The FRCC held public consultations on this stock in:

St. Anthony, NL (November 19)
Twillingate, NL (November 20)
Sunnyside, NL (December 8)

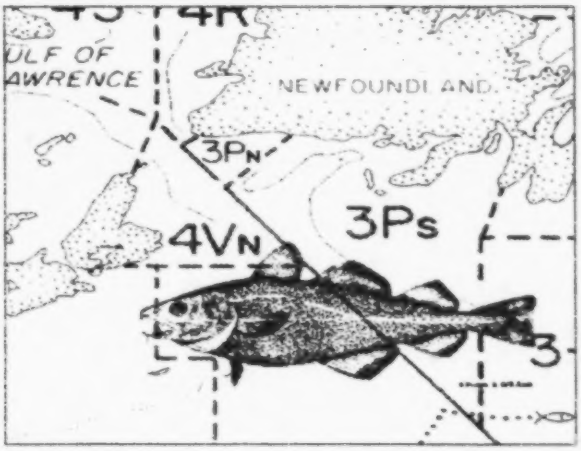
Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator: :	very low, status unknown
	Compared to average
Spawning Biomass:	unknown
Total Biomass:	unknown
Recruitment:	unknown
Growth and Condition:	unknown
Age Structure:	unknown
Distribution:	unknown
Recent Exploitation Level:	none - no fishery

COD - 3PS



PERSPECTIVE

Currently the largest cod fishery in Atlantic Canada, the management area for this stock extends from Cape St. Mary's to west of Burgeo Bank, and south over St. Pierre Bank to the edge of the Laurentian Channel. The stock is composed of a number of sub-components whose relationship is not well understood. Seasonal migrations both within the stock from the offshore to the inshore and back, as well as migrations across stock management boundaries confound the understanding of the dynamics of this stock.

Catches from this stock have supported an inshore fixed gear fishery in southern Newfoundland for centuries. Fish are also caught offshore on the St. Pierre and Burgeo Banks, among others. Prior to the extension of Canadian jurisdiction, this stock was heavily exploited by non-Canadian fleets, mainly from Spain. Through the 1980s, fishing effort by Canada and France peaked in 1988 with landings of 59,000t.

In August 1993, the low estimates of biomass for this stock led the Council to recommend that fishing be discontinued, at least until April 30, 1994. The fishery was closed by DFO in September 1993. While the Council indicated in its November 1993 report that recommendations for this stock would be forthcoming following the analysis of the results of the spring survey, such a review was made unnecessary when the fishery was closed by the Minister of Fisheries and Oceans for the whole year.

In November 1994, the Council recommended that there be no directed fishing for 3Ps cod in 1995 and that by-catches be kept to the lowest possible level. The Council also recommended that efforts be made to expand surveys into inshore areas, and that a broad-based Sentinel Fishery program be implemented. The Council's recommendations for 1996 were for a continued moratorium and a significantly expanded Sentinel Fishery.

In 1997 the FRCC recommended a limited commercial fishery with a TAC of 10,000t. In March 1998, the Council recommended that the TAC for this stock be set at 20,000t, but that measures be taken to disperse the total catch over the fishing year to minimize impacts on stock sub-components. In March 1999, based on the positive outlook in the stock status report and the overwhelmingly optimistic views of industry, the FRCC recommended that the TAC be set at 30,000t. Additional recommendations were made that were intended to enhance the age structure by increasing the survival rate of older fish, to protect 4RS3Pn fish overwintering on Burgeo Bank, and improve the reliability of the trawl survey.

In 2000, based on a revised outlook for the stock the FRCC recommended the TAC be reduced to 20,000t. In addition, the FRCC recommended the closure of several known spawning areas and further restrictions on the use of gillnets in the fishery. For 2001/2002, the FRCC recommended the TAC be set at 15,000t for 2 years, and that a reduction might be appropriate if pessimistic assessments were confirmed. The Minister implemented a one year TAC of 15,000t for 2001/2002. The FRCC expressed strong views about the lack of sustainable conservation measures in this stock and made several prescriptive recommendations in an attempt to correct this. The FRCC was of the view that without significant change in the fishery, the stock would likely continue to decline.

The FRCC conducted public consultations in Harbour Breton and Sunnyside in November and December 2002. There was general agreement from industry that TAC stability should be a primary goal in this fishery, and that the current quota was in line with current stock conservation goals. There were also views that the stock could sustain a quota increase, but agreement that a conservative approach should be taken to enhance the likelihood of stability in the fishery and stock growth. There were concerns expressed about increasing numbers of harp seals that can be observed in Placentia Bay, in particular in the bottom of the Bay and around the cod grounds adjacent to Bar Haven and Woody Islands.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	41	41	41	41	35.4	35.4	35.4	35.4	20	No directed fishery			10	20	36	20	15	15
Catch	51.4	57.9	54.3	38.8	37.8	40.7	42.4	29.8	14	0.66	0.41	0.20	8.0	19.80	34	19.5	15.13	9.3

*Canadian Catch as of Nov. 28/02

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

Analysis

The over-riding long-term strategy for the 3Ps cod stock is to conserve and rebuild the stock to its historical level in order to provide for the long-term sustainable utilization of the resource and the ecosystem upon which it depends. In particular, the goals are to:

- Rebuild – to rebuild the spawning stock biomass (ages 6+) of all stock components to levels compatible with historical periods of relatively high biomass and stable fisheries (the 1960s).
- Conserve – to conserve the resource for the fishery by avoiding over-exploitation of sub-components and protecting spawning and juvenile fish.
- Restore – to restore the geographical and age distribution of the stock.

FRCC recommendations and management measures implemented during the past four years have not been fully successful but have made progress towards those objectives.

It was the view of the FRCC that the Stock Status Report (SSR) represented an attempt to provide an unbiased view of the stock status and acknowledged uncertainties in the assessment. The 2002 Fall SSR indicates that:

- Spawner biomass in November, 2002 is estimated to be between 64,000 and 167,000t using the same 5 model formulations used in 2001, and for comparison, 110,000t using the same formulation as in both 2000 and 2001. All formulations indicated a declining biomass in 2001, and a slight increase in 2002 from 2001, with absolute levels being uncertain and model-dependent. The 2001 run of the model indicated a spawning biomass of 92,000t. For comparison, adding the 2002 data to the same model yields a somewhat more optimistic result for recent years, for example a spawning biomass of 105,000t in 2001.
- The biomass of fish aged 3 and older in January 2001 is estimated to be 180,000t and to have increased somewhat over the past 2 years.
- Exploitation rates in Placentia Bay exceeded 20% in 1999 and 2000 in many tagging experiments, especially for experiments on the resident sub-stock component that over-winters and spawns within the Bay, and averaged 19% in 2002. Exploitation in other areas is substantially lower, in particular in the eastern St. Pierre Bank-Halibut Channel region.
- Estimates of recruitment (numbers at age 3) show a general downward trend over the period 1959 to 1996 with year-classes from 1993 to 1996 being particularly low. However, the 1997 to 1999 year-classes appear to be relatively strong.
- Cold-water conditions in the early 1990's were associated with poor recruitment. Warmer conditions and relatively large #'s of spawners from the 1989 and 1990 year-classes were associated with the strong year-classes of 1997 to 1999. However, in 2000 and 2001 there were declining #'s of larger fish in at least some stock components and colder conditions since 2001.
- Low age at maturity may indicate stress in fish populations. Female age at maturity was low throughout the 1990s, but may have increased in the past few years. Although there was some indication that age at maturity had increased recently, there continues to be a low age at maturity for females compared to earlier years. Size at age had increased somewhat from the very low levels of the mid-1990's, but remains highly variable from year to year.
- Projections from the 5 model formulations indicated that spawner biomass is expected to be higher by 2005 compared to 2002 under TAC options of ranging from 10,000to 20,000t.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	41	41	41	41	35.4	35.4	35.4	35.4	20	No directed fishery			10	20	36	20	15	15
Catch	51.4	57.9	54.3	38.6	37.8	40.7	42.4	29.6	14	0.66	0.41	0.20	9.0	19.60	34	19.5	15.13	9.3

*Canadian Catch as of Nov. 28/02

1. Figures are from the Integrated Fisheries Management Plan Atlantic Groundfish

Analysis

The over-riding long-term strategy for the 3Ps cod stock is to conserve and rebuild the stock to its historical level in order to provide for the long-term sustainable utilization of the resource and the ecosystem upon which it depends. In particular, the goals are to:

- Rebuild – to rebuild the spawning stock biomass (ages 6+) of all stock components to levels compatible with historical periods of relatively high biomass and stable fisheries (the 1960s).
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- Spawner biomass in November, 2002 is estimated to be between 64,000 and 167,000t using the same 5 model formulations used in 2001, and for comparison, 110,000t using the same formulation as in both 2000 and 2001. All formulations indicated a declining biomass in 2001, and a slight increase in 2002 from 2001, with absolute levels being uncertain and model-dependent. The 2001 run of the model indicated a spawning biomass of 92,000t. For comparison, adding the 2002 data to the same model yields a somewhat more optimistic result for recent years, for example a spawning biomass of 105,000t in 2001.
- The biomass of fish aged 3 and older in January 2001 is estimated to be 180,000t and to have increased somewhat over the past 2 years.
- Exploitation rates in Placentia Bay exceeded 20% in 1999 and 2000 in many tagging experiments, especially for experiments on the resident sub-stock component that over-winters and spawns within the Bay, and averaged 19% in 2002. Exploitation in other areas is substantially lower, in particular in the eastern St. Pierre Bank-Halibut Channel region.
- Estimates of recruitment (numbers at age 3) show a general downward trend over the period 1959 to 1996 with year-classes from 1993 to 1996 being particularly low. However, the 1997 to 1999 year-classes appear to be relatively strong.
- Cold-water conditions in the early 1990's were associated with poor recruitment. Warmer conditions and relatively large #'s of spawners from the 1989 and 1990 year-classes were associated with the strong year-classes of 1997 to 1999. However, in 2000 and 2001 there were declining #'s of larger fish in at least some stock components and colder conditions since 2001.
- Low age at maturity may indicate stress in fish populations. Female age at maturity was low throughout the 1990s, but may have increased in the past few years. Although there was some indication that age at maturity had increased recently, there continues to be a low age at maturity for females compared to earlier years. Size at age had increased somewhat from the very low levels of the mid-1990's, but remains highly variable from year to year.
- Projections from the 5 model formulations indicated that spawner biomass is expected to be higher by 2005 compared to 2002 under TAC options of ranging from 10,000to 20,000t.

Fishing mortality on older fish has been excessive, in particular in Placentia Bay, and a concentration of effort and catch in Placentia Bay threatens the sustainability of local spawning components and fisheries. There is also concern that trawlers on St. Pierre Bank may be targeting older and larger fish during the over-wintering and pre-spawning period, based on the age frequency distribution of their catch.

The 3Ps cod has good potential for growth in the coming years. The 1997 to 1999 year-classes appear to be the strongest in many years. However, the reductions of older fish (the 1989 and 1990 year-classes) since 1997, and evidence of cooling, suggests that reproductive potential may be reduced after 1999. In addition, there is potential to harvest or discard numbers of the incoming juvenile 1997 and 1998 year-classes before they attain maturity and contribute their full potential yield to the fishery. These year-classes may be essential to sustain the fishery for the next decade.

In recent years as much as 50% of the catch has been taken from Placentia Bay, which has provided a disproportionate amount of the landings relative to the proportion of the stock available to the fishery in this area. This percentage has dropped in the past year to 40%. There is concern that harvest rates of the stock sub-component that over-winters and spawns in the Bay remain too high, and are unlikely to be sustainable at current levels. Under the fundamental goal of conserving all sub-components of this stock, a concentration of effort and disproportionate reductions of any sub-component will of necessity delay any increases in the recommended TAC.

The FRCC repeats earlier recommendations for this stock. In particular:

- **to achieve a reduction in the proportion of the catch in Placentia Bay, fishing effort should be redirected from Placentia Bay to areas of lower current exploitation.**

The inner Placentia Bay substock component has been subject to a concentration of fishing effort and excessive fishing mortality in recent years. In particular, there has been an unacceptable decline in the older age classes that contribute most to reproductive potential. The primary but not exclusive over-wintering and spawning area for this substock is adjacent to the Bar Haven Islands. Most adults undertake feeding migrations to other areas of the Bay and outside the Bay from late spring to late fall. However, this area also holds numbers of the less migratory fish and juveniles year-round. The area adjacent to the Bar Haven Island region is particularly vulnerable to exploitation because of ease of access.

The FRCC recommends that within the area inside the perimeters of Sound, Woody, and Bar Haven Islands, from Garden Cove and Swift Current to Ship Island, no fishing should occur except by resident fishers. The zone includes a buffer area of approximately 500 m seaward from the islands. Other ongoing fisheries in the area should continue as normal i.e. lobster, lumpfish.

The FRCC is of the view that in order to increase the biomass of this stock all components require protection during the spawning season.

The FRCC recommends that the following closures to all directed 3Ps cod fishing be implemented:

a) **the St. Pierre bank and adjacent shelf areas including the Halibut channel area of 3Ps (3Psdefgh) from March 1 to June 30.**

b) **all of the coastal zone (3Psabc) from March 1 to May 31.**

There is substantial mixing of the 3Ps and 3Pn4RS stocks in winter on Burgeo bank.

The FRCC recommends that the winter fishing closure on Burgeo bank from November 15 through April 15 be continued.

Stock assessments have been based on both bank and coastal sub-component data. A large proportion (to 50%) of catch data come from Placentia Bay, whereas the dominant model indices (RV and GEAC trawl surveys) are derived only from the banks. There is potential for bias in this melding of data, and resultant uncertainty in spawner biomass of the various regions, in particular St. Pierre Bank and its adjacent regions.

The FRCC recommends that spawner abundance be determined for the major regions of the full stock area, in particular for St. Pierre Bank, and that alternative survey and assessment methods be considered.

There has been a sharp increase in the use of gillnets in this fishery as compared to the historical period. The FRCC has made previous recommendations to decrease the use of gillnets in this fishery, but this has not yet been achieved. There are concerns that the use of gillnets may in some cases result in increased discarding rates. There are also concerns that the practice of tracking year-classes by sequential increases in gillnet mesh size, as strong year-classes grow older, results in an unacceptably low survival rate to older ages (>10 years). Older fish are necessary to reproductive poten-

tial. An investigation would be timely of how mesh size regulations, for example using a single mesh size, would discourage cohort tracking in the fishery, and how such regulations might affect survival and productivity.

The FRCC recommends that DFO conduct studies on the effects of gillnets and various mesh size regulations on discarding and cohort tracking in 3Ps cod, with the goal of providing management advice on the long term use of gillnets in this fishery.

The FRCC believes that there is strong potential for growth in this fishery, and with the above conservation measures implemented, there is scope for increase in the TAC in coming years. However, the FRCC cautions that this optimistic prognosis for this fishery may be forestalled in coming years if immature fish and older fish are targeted, or if the concentration of effort on the Placentia Bay resident stock sub-component cannot be reduced.

The FRCC recommends that the TAC for 2003/2004 for 3Ps cod be set at 15,000t.

Sources

DFO Science

SSR A2-02 (2002) Subdivision 3Ps cod

FRCC Consultations

The FRCC held public consultations on this stock in:

Harbour Breton, NL (November 21)
Sunnyside, NL (December 8)

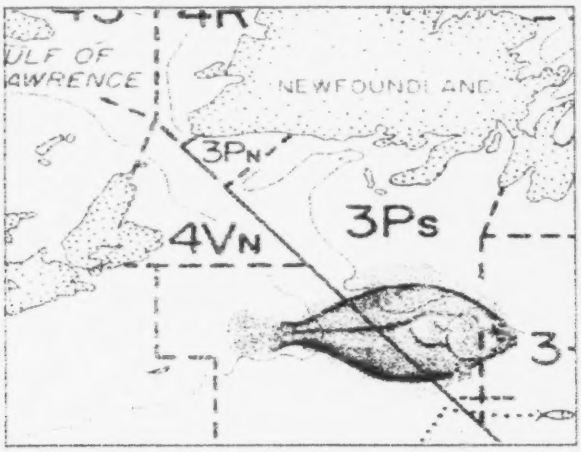
Written Briefs

Todd Chafe - Petty Harbour Fish Harvester (2002-010-00185)
Fish, Food and Allied Workers – Harvey Jarvis (2002-010-00214)
National Sea Products – Michael O'Connor (2002-010-00200)
Fisheries Renewal Action Committee – F. Winsor & D.Bavington (2002-010-00201)
Edward J. Sandeman - Torbay (2003-010-00004)

Council's Views on Stock Status

Overall indicator:	increasing
	Compared to average
Spawning biomass:	some increase, near long term average
Total biomass:	some increase
Recruitment:	recent years very strong
Growth and Condition:	stable growth, lower than in the 1970s; good condition
Age structure:	fish > 10 years of age rare, 3 to 5 year-olds abundant
Distribution:	normal
Recent exploitation Level:	too high on Placentia Bay sub-component; moderate elsewhere.

AMERICAN PLAICE - 3Ps



PERSPECTIVE

American plaice is a flatfish species found on both sides of the Atlantic. Its east Atlantic common name is long rough dab. It is found over a wide range of depths and temperatures as far north as arctic waters. This is a relatively slow growing species, females maturing at about age 9 at a size of about 36cm. Catches from the 3Ps stock were highest from 1968 to 1973 when they averaged over 10,000t but since 1980 catches have exceeded 5,000t only twice. The stock has been under moratorium since September 1993.

The FRCC held public consultations on this stock in Harbour Breton and Sunnyside during November and December 2002. Due to pressure of other business there was relatively little comment on this stock at the consultations. As in recent consultations, stakeholders continue to indicate a growing presence of American plaice in the bays and in the harvest of other directed fisheries in the 3Ps area. Some suggested a limited directed fishery using the appropriate gear type should be opened. There has been no action on the inshore test fisheries proposed in previous FRCC recommendations.

ANALYSIS

The Stock Status Rerport (SSR) produced in 2002 indicates that:

- Female spawning stock is growing but is as yet below the levels that have provided good recruitment in the past. Since 1997, year-classes increased towards levels seen in the late 1980s and early 1990s but still an order of magnitude smaller than levels seen in the early 1980s. These year-classes will not enter the fishery for several years.
- The 1994-97 year-classes currently recruiting to the by-catch fishery are the smallest in the series.
- Catch to survey exploitable biomass ratios indicate an exploitation rate of about 5%. However, the GEAC survey gives higher exploitable biomass estimates and would thus provide lower exploitation rates.
- Catches in recent years are increasing due to increasing by-catches, especially in the 3Ps cod and 3Ps witch fishery where the by-catch rate is on occasion more than a 100% (far in excess of the 50% allowable by-catch)
- The age of 50% male maturity has decreased from age 7 to age 4 from the mid 1960 to the present. Female age of 50% maturity has declined from about 11 to about 8 over the same period.

An industry briefing indicated increasing catch rates in the GEAC survey, increasing by-catch rates and low harvest rates. It argues for additional catch of 250 – 500t for the purpose of allowing other fisheries to continue without undue restriction.

The FRCC has reviewed the current indicators from the SSR and the trend in by-catches and the indications from fishermen throughout the stock area and is of the view that the 3Ps plaice be conserved as far as possible to allow further building but that ongoing fisheries for which quotas have been established be permitted to be conducted.

The FRCC recommends that DFO management and Industry continue to diligently seek ways of reducing American plaice by-catch e.g., temporary area closures or the formation of a Plaice Box "no take zone".

The FRCC recommends that there be no directed fishing for 3Ps American plaice in 2003/ 2004.

The FRCC recommends that catches not exceed those required for fisheries truly directed towards other species.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	5	5	5	5	5	4	4	4	3	No directed fishery								
Catch	4.2	5.1	4.9	3.5	3.9	3.9	4.2	2.6	0.3	0.1	0.09	0.56	0.17	0.16	0.82	0.39	1	0.6

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

The FRCC also encourages focused studies to discover the times, areas and gears where a future American plaice fishery might be conducted with minimal by-catch of other species.

The FRCC continues to recommend that industry in consultation with DFO scientists establish focused scientifically based studies to determine the abundance of plaice in the nearshore waters and bays outside the research vessel and GEAC survey areas so that a future American plaice fishery might be conducted by area, time and gear type with minimal by-catch of other species.

During the following year, the FRCC intends to initiate discussions of a FRCP for this stock in collaboration with DFO and industry.

Sources

DFO Science

SSR A2-12 (2002) American Plaice in subdivision 3Ps

FRCC Consultations

The FRCC held public consultations on this stock in:

Harbour Breton, NL (November 21)
Sunnyside, NL (December 8)

Written Briefs

Groundfish Enterprise Allocation Council – Bruce Chapman (2002-010-00216)
Groundfish Enterprise Allocation Council – Joanne Vokey (2002-010-00218)

Council's Views on Stock Status

Overall Stock Indicator:	increasing
	Compared to average
Spawning Biomass:	improving
Total Biomass:	increasing
Recruitment:	poor
Growth and Condition:	not available
Age Structure:	all years low recently
Distribution:	increasing in all areas
Recent Exploitation Level:	low; by-catch only

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	5	5	5	5	5	4	4	4	3					No directed fishery				
Catch	4.2	5.1	4.8	3.5	3.9	3.9	4.2	2.6	0.3	0.1	0.09	0.56	0.17	0.16	0.82	0.39	1	0.6

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The FRCC held public consultations on this stock in:

Harbour Breton, NL (November 21)
Sunnyside, NL (December 8)

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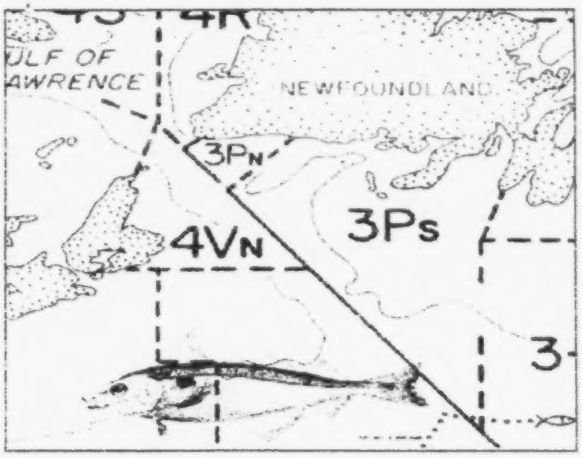
Groundfish Enterprise Allocation Council – Joanne Vokey (2002-010-00218)

Council's Views on Stock Status

Overall Stock Indicator:	increasing
	Compared to average
Spawning Biomass:	improving
Total Biomass:	increasing
Recruitment:	poor
Growth and Condition:	not available
Age Structure:	all years low recently
Distribution:	increasing in all areas
Recent Exploitation Level:	low; by-catch only

HADDOCK - 3PS



PERSPECTIVE

Haddock, a member of the cod family, are found on both sides of the North Atlantic. In the east Atlantic they are found as far north as the Barents Sea but in Newfoundland waters they are at the northern end of their west Atlantic range. Their abundance in 3Ps depends upon a few larger year-classes, the occurrence of which are probably related to warmer water temperatures as are the larger year-classes of haddock in the Barents Sea.

Haddock are a bottom feeding species. At smaller sizes their diet is composed largely of bottom dwelling invertebrates (e.g. shrimps, hermit crabs, brittle stars and sea urchins) but larger individuals include small fish in their diet. Their bottom dwelling behaviour should mean that surveys with bottom trawls can reasonably track their biomass. Catches of 3Ps haddock were generally over 2,000t in the 1960's at which time discarding was often substantial. Catches fell to lower levels in the 1970's and rose in the 1980s to peak at 7,500t in 1985. Catches reduced in the early 1990 and were on a "by-catch only" basis after 1994.

The FRCC held public consultations on this stock in St. Anthony, Twillingate, Harbour Breton and Sunnyside, during November and December 2002. One stakeholder stressed the need to develop a recovery policy for 3Ps haddock. No other comments were received on this stock.

ANALYSIS

There was no new scientific information available in 2002. The 2000 DFO Newfoundland Region Groundfish Overview indicated that:

- The index of biomass peaked in 1985 but declined to low levels in subsequent years.
- The 1998, 1999 and 2000 survey results indicate some increase, but the biomass was still low compared to the mid to late 1980s.
- The 1999 and 2000 surveys showed significant numbers of young haddock which appear as the 1998 year-class.

A presentation to the 2001 Fall RAP suggested survey estimated biomass and abundance were reduced in 2001 compared to 1999 and 2000 though still higher that the levels of the early 1990's.

The FRCC recommends that there be no directed fishing for 3Ps haddock in 2003/2004 and that there be a restrictive by-catch fishery only.

The FRCC recommends that DFO management monitor closely the by-catch of haddock and establish management protocols to ensure fishing mortality is minimized on the 1998 year-class.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	–	–	0.15	2.2	3.2	3.2	3.2	3.2	0.5	No directed fishery								
Catch	7.5	5.3	2.7	2.4	2.9	1.5	0.5	0.5	0.1	0.02	0.04	0.09	0.06	0.075	0.1	0.11	0.14	0.33

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A2-19 (2000) Newfoundland Region Groundfish Overview
Presentation to 2001 Fall RAP (Paper 23)

FRCC Consultations

The FRCC held public consultations on this stock in:

St. Anthony, NL (November 19)
Twillingate, NL (November 20)
Harbour Breton, NL (November 21)
Sunnyside, NL (December 8)

Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	low
	Compared to average
Spawning Biomass:	low, unknown
Total Biomass:	low, unknown
Recruitment:	some signs of recruitment from 1998 year-class in 1999 and 2000 survey.
Growth and Condition:	not available
Age Structure:	not available
Distribution:	increased inshore
Recent Exploitation Level:	low, by-catch only

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	–	–	0.15	2.2	3.2	3.2	3.2	3.2	0.5					No directed fishery				
Catch	7.6	5.3	2.7	2.4	2.9	1.5	0.5	0.5	0.1	0.02	0.04	0.09	0.06	0.075	0.1	0.11	0.14	0.33

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A2-19 (2000) Newfoundland Region Groundfish Overview
Presentation to 2001 Fall RAP (Paper 23)

FRCC Consultations

The FRCC held public consultations on this stock in:

St. Anthony, NL (November 19)
Twillingate, NL (November 20)
Harbour Breton, NL (November 21)
Sunnyside, NL (December 8)

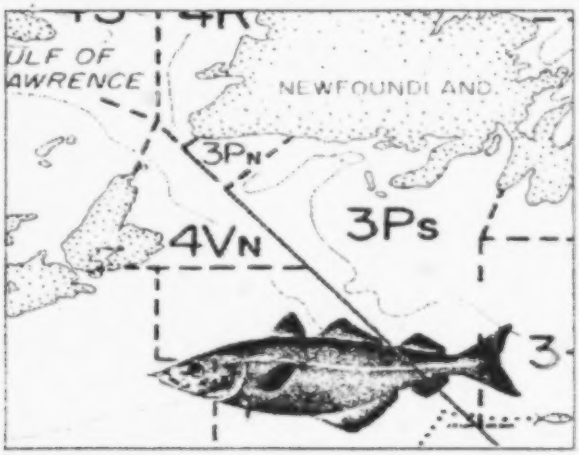
Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	low
	Compared to average
Spawning Biomass:	low, unknown
Total Biomass:	low, unknown
Recruitment:	some signs of recruitment from 1998 year-class in 1999 and 2000 survey.
Growth and Condition:	not available
Age Structure:	not available
Distribution:	increased inshore
Recent Exploitation Level:	low, by-catch only

POLLOCK - 3PS



PERSPECTIVE

Pollock, a semipelagic member of the cod family, is also found in the Northeast Atlantic where it is known as saithe, coalfish or coley (pollock there being the common name of another species). A midwater feeder, the diet of adult pollock is typically small fish and euphasids. In Newfoundland waters pollock is at the northern end of its range. Adult pollock are typically found in dense concentrations along the slopes of offshore banks. This distribution renders survey estimates of its abundance highly variable. However, they are caught throughout the year at various maturity stages and young pollock are occasionally found in harbours along the southern coast of Newfoundland. They thus have characteristics of a local stock rather than simply being incidental migrants from a more southerly stocks. Visual surveys of young pollock are used in Norway to provide approximate recruitment indices and similar low cost information might usefully be collected for this stock.

The FRCC held public consultations on this stock in Harbour Breton and Sunnyside in November and December 2002. Fishermen continue to suggest that 3Ps pollock appear to be more abundant and there might be enough to justify a directed fishery.

ANALYSIS

The 2002 DFO Stock Status Report (SSR) indicates that:

- The maturation and reproduction processes of pollock require relatively warm temperatures and that historically warmer periods have coincided with higher abundance of pollock in this area.
- Due to the pelagic nature of the species, research vessel surveys (bottom trawl) does not give a reliable index of abundance or biomass.
- In the 2001 and 2002, surveys numbers per tow increased relative to numbers seen during the 1990's but biomass estimates remained low. The increase in numbers was due to increases of mostly smaller pollock in inshore strata which are as yet of a size (mean 29cm) that would form part of a fishery during 2003.
- In general pollock do not occur in Newfoundland waters in sufficient numbers to support a major fishery.

The FRCC recommends that there be no directed fishing for 3Ps pollock in 2003/2004.

The FRCC recommends catches not exceed those required for the normal conduct of fisheries directed towards other species.

The FRCC appreciates DFO's timely development of a SSR for this stock in fulfillment of the 2001 recommendation.

Figures are in 000t

Year	1986	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	–	–	1.5	5.4	5.4	5.4	5.4	5.4					No directed fishery					
Catch	2.2	7.1	8.0	3.9	3.4	1.7	1.1	0.5	0.09	0.09	0.15	0.13	0.8	0.02	0.74	0.2	0.2	0.5

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A2-07 (2002) Subdivision 3Ps Pollock.

FRCC Consultations

The FRCC held public consultations on this stock in:

Harbour Breton, NL (November 21),
Sunnyside, NL (December 8)

Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	improved in recent years but mostly young fish.
	Compared to average
Spawning Biomass:	unknown
Total Biomass:	hard to estimate
Recruitment:	positive signs inshore
Growth and Condition:	unknown
Age Structure:	unknown
Distribution:	sporadic at northern limit of range; may increase with warmer water
Recent Exploitation Level:	low-medium, by-catch

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	–	–	1.5	5.4	5.4	5.4	5.4	5.4					No directed fishery					
Catch	2.3	7.1	6.0	3.9	3.4	1.7	1.1	0.6	0.06	0.09	0.15	0.13	0.6	0.02	0.74	0.2	0.2	0.5

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A2-07 (2002) Subdivision 3Ps Pollock.

FRCC Consultations

The FRCC held public consultations on this stock in:

Harbour Breton, NL (November 21),
Sunnyside, NL (December 8)

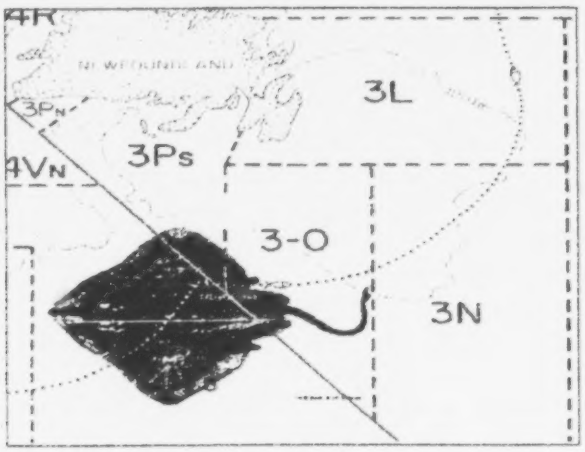
Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	improved in recent years but mostly young fish.
	Compared to average
Spawning Biomass:	unknown
Total Biomass:	hard to estimate
Recruitment:	positive signs inshore
Growth and Condition:	unknown
Age Structure:	unknown
Distribution:	sporadic at northern limit of range; may increase with warmer water
Recent Exploitation Level:	low-medium, by-catch

SKATES - 3LNOPS



PERSPECTIVE

Skate are present in the waters along the south coast of Newfoundland on St. Pierre Bank and on the Grand Bank. Skates are slow growing species that produce very few young annually. Skate are therefore, more readily subjected to over-exploitation. A directed fishery for skates developed on the southern Grand Banks during 1993. Council conducted its first review of this stock in 1995 and recommended a precautionary TAC of 2,000t for 1996 for this new fishery. It was further recommended that steps be taken to distribute effort throughout the management area to prevent heavy exploitation on concentrations. Council recommended a 3,000t TAC for 1997 with a provision that it be divided among three separate management units, 3LN, 3O and 3Ps, as defined in the 1996 Stock Status Report (SSR). As well, to supplement information gathering on this resource, cooperative industry science initiatives were encouraged.

The FRCC held public consultations on this stock in Harbour Breton and Sunnyside in November and December 2002. One written brief was received on this stock.

ANALYSIS

Of the 8-10 species of skate found in waters around Newfoundland and Labrador, thorny and smooth skates comprise the bulk of catches by commercial fishery and research vessels. Although thorny skates are widely distributed, tagging studies reveal they exhibit limited movement, with re-captured animals found infrequently beyond 100 kms of the site of initial capture.

In comparison to an individual cod which can release millions of eggs a year during a relatively short spawning period, a female skate will lay only 6-40 eggs throughout the year. Special challenges are presented by the limited reproduction potential of this species and insufficient biological information.

The 2000 DFO Newfoundland Groundfish Overview indicated an increase in survey biomass index across the entire stock area from historically low levels in the mid-1990s. Average size of skates is increasing due to the increased number of mature individuals in the population. The implementation of Council's recommendation for three separate management units for 1997 has begun the process of shifting effort across the entire stock area. Due to the sedentary nature of skates and their tendency to form local aggregations, the management over the three divisions appears to be having a positive effect. The serious deficiency of biological and abundance information on this resource has been emphasized. The FRCC is concerned that there continues to be an unregulated fishery outside Canada's 200-mile zone with recent reported catches in the order of 8-10,000t.

The FRCC recommends that 3LN, 30, and 3Ps continue to be treated as separate management areas.

The FRCC recommends that the overall TAC for 2003/2004 for 3LNOPs skates in the Canadian portion of the zone be set at 3,000t. This quota should be distributed between management areas, as recommended in the 1996 SSR.

Figures are in 000t

Year	1988	1989	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC											6	2	3	3	3	3	3	3
Catch	11.4	15.9	19.3	19.5	15.9	14.7	28.4	4.1	5.5	11.5	7.5	5.9	13.7	14.1	13.1	19.1	11.2	2.4

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A2-19 (2000) Newfoundland Region Groundfish Overview

FRCC Consultations

The FRCC held public consulations on this stock in:

Harbour Breton, NL (November 21)
Sunnyside, NL (December 8)

Written Briefs

Tom Fennelly (2002-010-00191)

Council's Views on Stock Status

Overall Stock Indicator:	increasing trend
	Compared to average
Spawning Biomass:	unknown
Total Biomass:	recovering, improving trend
Recruitment:	unknown
Growth and Condition:	not available
Age Structure:	improving
Distribution:	local concentrations
Recent Exploitation Level:	increasing in the unregulated foreign fishery

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC											6	2	3	3	3	3	3	3
Catch	11.4	15.9	19.3	19.5	15.9	14.7	28.4	4.1	5.5	11.5	7.5	5.9	13.7	14.1	13.1	19.1	11.2	2.4

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A2-19 (2000) Newfoundland Region Groundfish Overview

FRCC Consultations

The FRCC held public consulations on this stock in:

Harbour Breton, NL (November 21)
Sunnyside, NL (December 8)

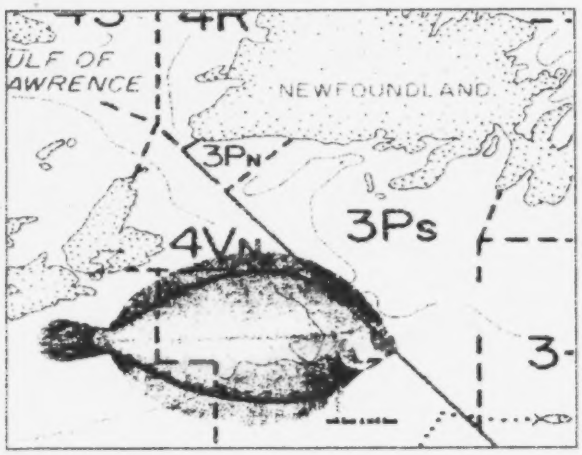
Written Briefs

Tom Fennelly (2002-010-00191)

Council's Views on Stock Status

Overall Stock Indicator:	increasing trend
	Compared to average
Spawning Biomass:	unknown
Total Biomass:	recovering, improving trend
Recruitment:	unknown
Growth and Condition:	not available
Age Structure:	improving
Distribution:	local concentrations
Recent Exploitation Level:	increasing in the unregulated foreign fishery

WITCH FLOUNDER - 3PS



PERSPECTIVE

Witch flounder is a deepwater flatfish species. In the west Atlantic it is found as far north as southern Labrador waters. It is a long lived, slow growing species.

The FRCC held public consultations on this stock in Harbour Breton and Sunnyside during November and December 2002. Due to pressure of other business there was relatively little comment on this stock at the consultations.

ANALYSIS

The 2002 Stock Status Report (SSR) indicates that:

- Mean biomass index during the 1996-2002 is about 75% of the 1983-1990 period, but has increased since 1999.
- No indication of increased recruitment.
- Stock appears to be stable under current level of exploitation.
- Quotas for witch were first set in the mid-1970s at 3,000t; these were reduced to 1,000t in the late 1980's.Catches come mainly from St. Pierre Bank in depths of 200-900 m.
- The research survey relative biomass index has shown substantial variation but no trend between 1976-1994. The research survey does not cover Fortune Bay where a large portion of the catch occurs. The 1999/2000 GEAC surveys show results similar to the DFO survey. The CPUE in the offshore fishery has increased from 843 kg/hr in 1999 to 1,092 kg/hr in 2001 and inshore fishermen indicate that catches in the Danish sein fishery have been among the highest seen.

The FRCC is pleased to note that following its 2000 recommendation, mesh size has now been standardized at 155mm diamond.

The FRCC recommends that the 2003/2004 TAC for 3Ps witch flounder be set at 650t.

The FRCC continues to recommend that a joint DFO/industry study be conducted in the inshore areas to assist in the overall assessment process such as appropriate biological sampling, a tagging/ movement component, and identification of stock sub-components. The industry survey is to be conducted concurrently with the DFO research vessel survey to ensure that no double counting or "missed fish" occurs due to possible movement into/ out of survey areas.

The FRCC continues to recommend that tonnages required for this work are to be determined by DFO science and allocated for this purpose only upon approval of a comprehensive plan. These catches are to be in addition to TAC. An evaluation of the study is to be conducted upon completion of its year of implementation.

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	3	3	3	1	1	1	1	1	1	1	1	0.5	0.5	0.85	0.85	0.85	0.85	0.85
Catch	0.6	1.1	1	0.30	0.67	1	1.1	1	0.86	0.4	0.28	0.23	0.28	0.81	0.71	0.21	0.85	0.142

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A2-09 (2002) Witch flounder in NAFO Subdivision 3Ps

FRCC Consultations

The FRCC held public consultations on this stock in:

Harbour Breton, NL (November 21)
Sunnyside, NL (December 8)

Written Briefs

No briefs received

Council's Views on Stock Status

Overall Stock Indicator:	about recent average
	Compared to average
Spawning Biomass:	not available
Overall Biomass:	75% of the 1983-1990 period, but has increased since 1999.
Recruitment:	about long term average
Growth and Condition:	not available
Age Structure:	not available
Distribution:	in deep water
Recent Exploitation Level:	low

Figures are in 000t

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000/01	2001/02	2002/03*
TAC	3	3	3	1	1	1	1	1	1	1	1	0.5	0.5	0.65	0.65	0.65	0.65	0.65
Catch	0.8	1.1	1	0.30	0.87	1	1.1	1	0.86	0.4	0.26	0.23	0.28	0.61	0.71	0.21	0.65	0.142

*Canadian Catch as of Nov. 28/02

1. Above figures include Reported Landings extracted from the Integrated Fisheries Management Plan Atlantic Groundfish (IFMP)

Sources

DFO Science

SSR A2-09 (2002) Witch flounder in NAFO Subdivision 3Ps

FRCC Consultations

The FRCC held public consultations on this stock in:

Harbour Breton, NL (November 21)
Sunnyside, NL (December 8)

Written Briefs

No briefs received

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Spawning Biomass:	not available
Overall Biomass:	75% of the 1983-1990 period, but has increased since 1999.
Recruitment:	about long term average
Growth and Condition:	not available
Age Structure:	not available
Distribution:	in deep water
Recent Exploitation Level:	low

Appendix 1: Science Priorities Letter

LETTER TO THE MINISTER

October 18, 2002

The Honorable Robert G. Thibault, P.C., M.P.
Minister of Fisheries and Oceans
200 Kent Street
Ottawa, ON K1A 0E6

Dear Minister,

A part of the mandate of the Fisheries Resource Conservation Council (FRCC) is to provide you with advice on priorities for DFO science. As you appreciate, good information from both science and from the fishing industry are vitally important to our ability to provide you with sound and credible advice on groundfish stocks in Atlantic Canada. The FRCC remains committed to the importance of fisheries science both within DFO and the academic community in Canada.

In the past, the FRCC has made recommendations for specific projects. These remain important, and we note that many of these have already been acted upon. Some, such as the need to identify the key spawning areas of many species, have not been carried-out. We reiterate the need to accomplish this and other unattained objectives.

In 2001, the FRCC made recommendations on Science priorities that remain important. These were:

- a revitalisation of the scientific basis of fisheries management;
- improved monitoring and surveying of fish stocks and the environment; and
- improvements in the communication of DFO science.

These points circumscribe a general strategy for science renewal. This year we are providing some suggested tactics that we believe are a means to these ends.

REVITALISATION OF FISHERIES SCIENCE

The FRCC believes that the most effective way to increase and enhance scientific capacity for Canada's fisheries is to partner DFO Science with academic fishery scientists and with Industry. There is a growing willingness on the side of industry and with key academics to work alongside DFO Science to try to shed light on key ecosystem function questions that are critical to a better understanding of the NW Atlantic ecosystems. Furthermore, there may be substantial financial benefits to be gained by such partnering through equipment, personnel (including graduate students and future fishery scientists funded through the DFO Science subvention program), and focus sharing. There may also be increasing opportunities to bring in industrial interests other than from the fisheries sector, in particular from oil and gas.

It is important to note that in developing credible partnerships, the independence of the science must be maintained and fostered. Such independence must be a cornerstone of all partnerships among DFO Science, academic science, and Industry.

Developing a partnering strategy will require seed funding. **The FRCC recommends that DFO provide funding to bring about a trial research program that links DFO Science with academics and industry through common interest in major fisheries problems.**

The major fisheries problem and the partnerships may be defined by developing one or more research themes that would bridge the regions and help in bringing scientists from the different regions and backgrounds together on important issues. The FRCC believes that one important theme might be the interactions of fisheries with ecosystem changes in the NW Atlantic and the recovery potential of key stocks. Such a theme spans several disciplines (oceanography, environmental and fisheries sciences, genetics, stock assessment) and species groups (groundfish, pelagics, crustaceans, plankton), and also key sectors of fisheries management and industry.

Support for Improved Monitoring

The Council's objective in focussing on this issue is to provide the efficient, continuous monitoring of fish stocks, fisheries and the biotic and abiotic environments which are required by scientific advice. The entire fishing industry, and indeed all stakeholders with an interest in Canada's oceans, depend on the processes of collecting and interpreting biological and other scientific information about fisheries and stocks and the ecosystem they live in.

The FRCC believes that an improved partnering with Industry has the potential to greatly improve monitoring capacities without incurring incremental costs.

Communication

Communication within DFO and between DFO and other fisheries interests and the public is very important. The FRCC believes that the credibility of both science and management often suffers because of poor communication, or perceptions of non-transparency. There are at least 2 actions that could be taken to alleviate these concerns.

In the interests of co-operation and transparency, the **FRCC recommends that stock assessment, environmental and biological research data should be made more widely available both within and outside DFO.** This could be done most effectively by posting data on a public website without restrictions on use or ownership. The FRCC believes that such an undertaking would greatly benefit DFO, and would not only quash any issues of non-transparency, but also have potential to bring in useful expertise and analyses from non-DFO science. We fully understand that this is a difficult issue for many scientists but we believe that the benefits far outweigh any negative impacts, and will encourage interactions between DFO and academic scientists and industry.

The FRCC is also concerned that fully external and independent peer review is not universally applied in the assessment process. Credibility of the process demands that independent reviews be conducted, and the **FRCC recommends that such review be undertaken on all assessments.**

In addition to these general considerations of DFO Science partnering outside of DFO, there are also issues of intra-DFO partnering. The recent review of the FRCC, entitled "Working together towards a Renewed Mandate of the Fisheries Resource Conservation Council" (May 2002) included the following recommendation re DFO Science Sector:

"Science should undertake an in-depth review of the DFO resource assessment process with a view to harmonizing the assessment process inter-regionally and achieving a more consistent approach to assessments for groundfish and for other species. The Canadian Science Advisory Secretariat should, in consultations with the Regions, develop clear guidelines and standards for the regional, zonal, and national assessment processes, particularly with respect to rigorous peer review and the inclusiveness issue."

The FRCC considers this recommendation to be an important science priority for coordinating science in the Atlantic zone to reduce potential regional overlap and duplication. We understand that DFO has made progress on this issue, and look forward to learning of this and how implementation might proceed. More direct coordination of regional science activities would be beneficial - including setting up rational schedules for RAPs and benchmark reviews

The FRCC is firmly committed to long-term planning with respect to fish stocks. Toward this end, DFO and the FRCC have already embarked on initiatives for longer-term plans for Atlantic groundfish stocks, e.g., the OBFM initiative and the FRCC's FRCP work. These important initiatives include the definition of multiannual TAC schedules and decision rules for the operationalizing within these plans a precautionary approach. These initiatives implicate industry in a developing partnership relationship that depends on science information about stocks, their productivity, ecosystem effects, and exploration of possible forecasts in the fishery. However, there is concern about apparent overlaps and even conflicts among these various initiatives, and a lack of co-ordination among them. Therefore, the **FRCC recommends that the long-term plans (FRCPs) under development by the FRCC be explicitly linked with DFO planning exercises, and that DFO commits to this process by providing the necessary data on a timely basis.**

Minister, the most likely path to enhanced success with our Atlantic fisheries, and a better understanding of the ecosystems they inhabit, is to mould your Department into meaningful partnerships among science, management and industry. The FRCC believes that the setting of major cross-regional research themes would assist your department in attaining this goal.

Yours truly,

Fred Woodman,
Chairman

Appendix 2: FRCC Mandate and Membership

FRCC Terms of Reference

1. Introduction

The Government of Canada is committed to a more comprehensive approach to the conservation and management of our fisheries resource. This approach demands a better understanding of complex fisheries ecosystems - the interaction of fish with other species, predator-prey relationships, and also changes in the marine environment like ocean currents, water temperatures and salinity.

The Government of Canada is also committed to a more effective role in decision-making for those with practical experience and knowledge in the fishery.

The Minister of Fisheries and Oceans has established the Fisheries Resource Conservation Council (FRCC) as a partnership between government, the scientific community and the direct stakeholders in the fishery. Its mission is to contribute to the management of the Atlantic fisheries on a 'sustainable' basis by ensuring that stock assessments are conducted in a multi-disciplined and integrated fashion and that appropriate methodologies and approaches are employed; by reviewing these assessments together with other relevant information and recommending to the Minister total allowable catches (TACs) and other conservation measures, including some idea of the level of risk and uncertainty associated with these recommendations; and by advising on the appropriate priorities for science.

2. Definition of Conservation

Fisheries conservation is that aspect of the management of the fisheries resource which ensures that its use is sustainable and which safeguards its ecological processes and genetic diversity for the maintenance of the resource. Fisheries conservation ensures that the fullest sustainable advantage is derived from the resource and that the resource base is maintained.

3. Council Objectives

3.1 To help the government achieve its conservation, economic and social objectives for the fishery.The conservation objectives include, but are not restricted to:

3.1.1 rebuilding stocks to their 'optimum' levels and thereafter maintaining them at or near these levels, subject to natural fluctuations, and with 'sufficient' spawning biomass to allow a continuing strong production of young fish; and,

3.1.2 managing the pattern of fishing over the sizes and ages present in fish stocks and catching fish of optimal size.

3.2 To develop a more profound understanding of fish-producing ecosystems including the inter-relationships between species and the effects of changes in the marine environment on stocks.

3.3 To review scientific research, resource assessments and conservation proposals, including, where appropriate, through a process of public hearings.

3.4 To ensure that the operational and economic realities of the fishery, in addition to scientific stock assessments, are taken into account in recommending measures to achieve the conservation objectives.

3.5 To better integrate scientific expertise with the knowledge and experience of all sectors of the industry and thus develop a strong working partnership.

3.6 To provide a mechanism for public and industry advice and review of stock assessment information.

3.7 To make public recommendations to the Minister.

4. Mandate and Scope

4.1 The Fisheries Resource Conservation Council will address these objectives by bringing together industry, DFO science and fisheries management, and external scientific and economic expertise in one body.

4.2 The Council will:

4.2.1 advise the Minister on research and assessment priorities;

4.2.2 review DFO data and advise on methodologies;

4.2.3 consider conservation measures that may be required to protect fish stocks;

4.2.4 review stock assessment information and conservation proposals, including through public hearings, where appropriate; and,

4.2.5 make written public recommendations to the Minister on TACs and other conservation measures.

4.3 The Council may recommend any measures considered necessary and appropriate for conservation purposes such as TACs, closure of areas to fishing during specific periods, approaches to avoid catching sub-optimal sized fish or unwanted species, and restrictions on the characteristics or use of fishing gears.

4.4 The Council's scope includes Canadian fish stocks of the Atlantic and Eastern Arctic Oceans. In the first instance, the Council will address groundfish, and then subsequently take on responsibility for pelagic and shellfish species.

4.5 The Council may also advise the Minister on Canada's position with respect to straddling and transboundary stocks under the jurisdiction of international bodies such as the Northwest Atlantic Fisheries Organization (NAFO).

5. Size, Structure and Make-Up

5.1 The Council will consist of not more than 14 members with an appropriate balance between 'science' and 'industry'.

5.2 Members are chosen on merit and standing in the community, and not as representatives of organizations, areas or interests.

5.3 'Science' members, are drawn from government departments, universities or international posts, and are of an appropriate mix of disciplines, including fisheries management and economics.

5.4 'Industry' members are knowledgeable of fishing and the fishing industry and understand the operational and economic impacts of conservation decisions.

5.5 All members of the Council are appointed by the Minister.

5.6 All members, including the Chairperson, are appointed for a three year term; terms can be renewed.

5.7 Members appointed from DFO serve 'ex officio'.

5.8 Members have to disclose any interest in the Atlantic or Eastern Arctic fishery and take appropriate measures so as to avoid potential or real conflict of interest situations during the term of appointment.

5.9 The four Atlantic Provinces, Quebec and Nunavut may each nominate one delegate to the Council. These delegates have access to the Council's information, and may participate fully in meetings, but will not be asked to officially endorse the formal recommendations to the Minister

5.10 The Council is supported by a small Secretariat, to be located in Ottawa. The Secretariat will:

5.10.1 provide administrative support for the functioning of the Council;

5.10.2 provide a technical science and fisheries management support;

5.10.3 organize Council meetings;

5.10.4 record decisions of the Council;

5.10.5 undertake a professional communications function for the Council, providing a central point for communications to and from the Council; and

5.10.6 undertake such other matters as from time to time might be appropriate.

5.11 The Chairman may appoint an Executive Committee, consisting of the Chairman, Vice-Chairman, and three other Members.

5.12 In addition, the Chairman may, from time to time, strike an 'ad hoc' committee to deal with a specific issue.

6. ACTIVITIES:

6.1 Reviews appropriate DFO science research programs and recommends priorities, objectives and resource requirements.

6.2 Considers scientific information - including biology, and physical and chemical oceanography, taking into account fisheries management, fishing practices, economics and enforcement information.

6.3 Conducts public hearings wherein scientific information is presented and/or proposed conservation measures/options are reviewed and discussed.

6.4 Recommends TACs and other conservation measures.

6.5 Prepares a comprehensive, long-term plan and a work plan for the Council which are reviewed annually at a workshop with international scientists and appropriate industry representatives.

6.6 Ensures an open and effective exchange of information with the fishing industry and contributes to a better public understanding of the conservation and management of Canada's fisheries resource.

FRCC MEMBERSHIP:

MEMBERS:

Fred Woodman, Chairman
Jean Guy d'Entremont, Vice-Chair
Maurice Beaudin
Bill Broderick
Bruce Chapman
Guy Cormier
Nick Henneberry
Douglas Johnston
Dan Lane
Jean-Jacques Maguire
Paul Nadeau
John Pope
George Rose
Karl Sullivan

PROVINCIAL DELEGATES:

Carey Bonnell, Nunavut
Mario Gaudet, New Brunswick
David MacEwan, Prince Edward Island
Dario Lemelin, Québec
Tom Dooley, Newfoundland and Labrador
Clary Reardon, Nova Scotia

EX OFFICIO:

Gilles Belzile
Barry Rashotte
David Gillis

SECRETARIAT:

Arthur Willett, Executive Director
Tracey Sheehan
Helena Da Costa
Debra Côté

ACRONYMS

CPUE: Catch per unit of effort

DFO: Department of Fisheries and Oceans

FRCC: Fisheries Resource Conservation Council

GEAC: Groundfish Enterprise Allocation Council

IFMP: Integrated Fisheries Management Plan

ITQ: Individual Transferable Quotas

IVQ: Individual Vessel Quotas

MPA: Marine Protected Area

NAFO: Northwest Atlantic Fisheries Organization

PA: Precautionary Approach

RAP: Regional Advisory Process

RV: Research Vessel

SSB: Spawning Stock Biomass

SSR: Stock Status Report

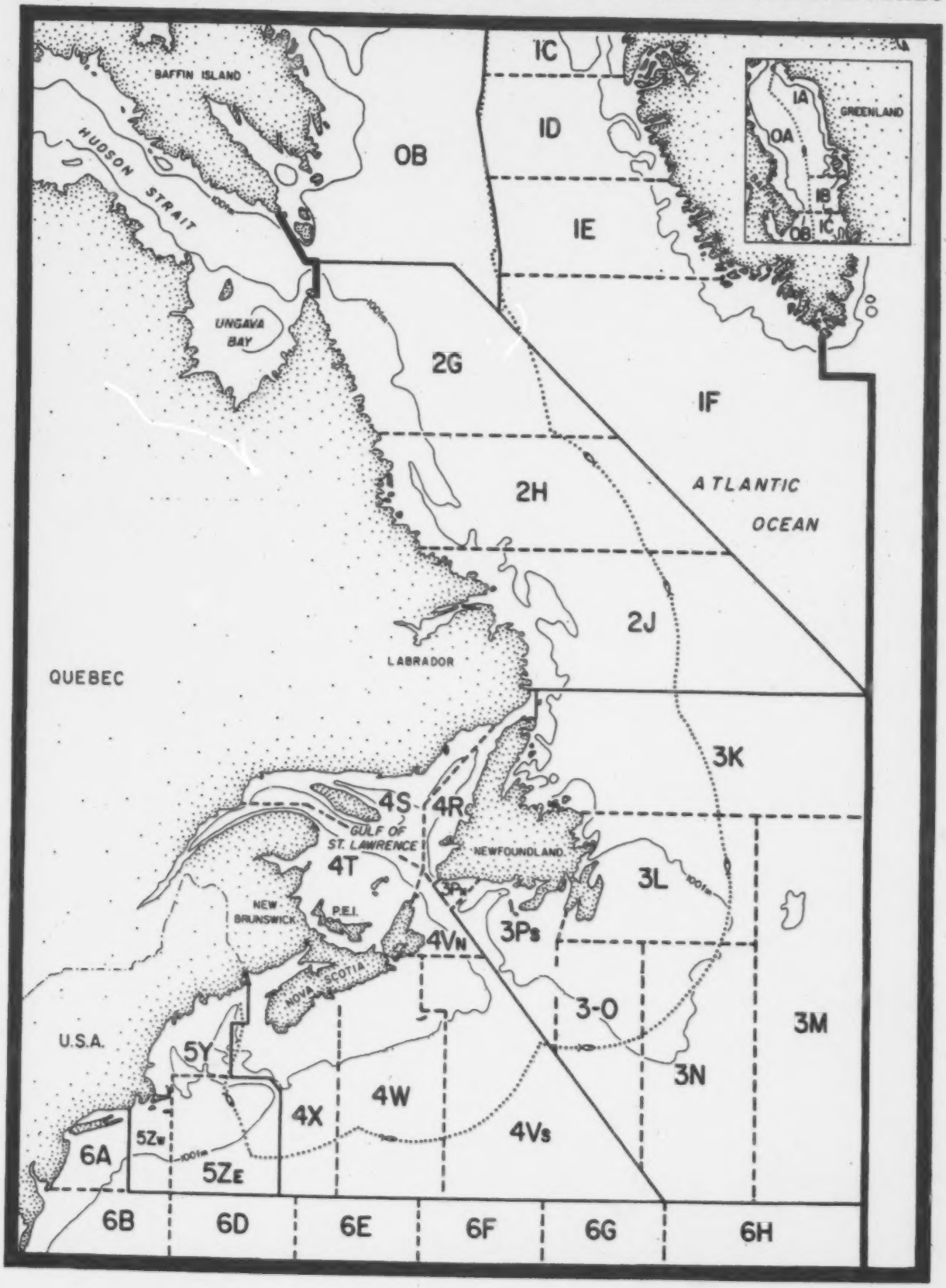
TAC: Total Allowable Catch

TAGS: The Atlantic Groundfish Strategy

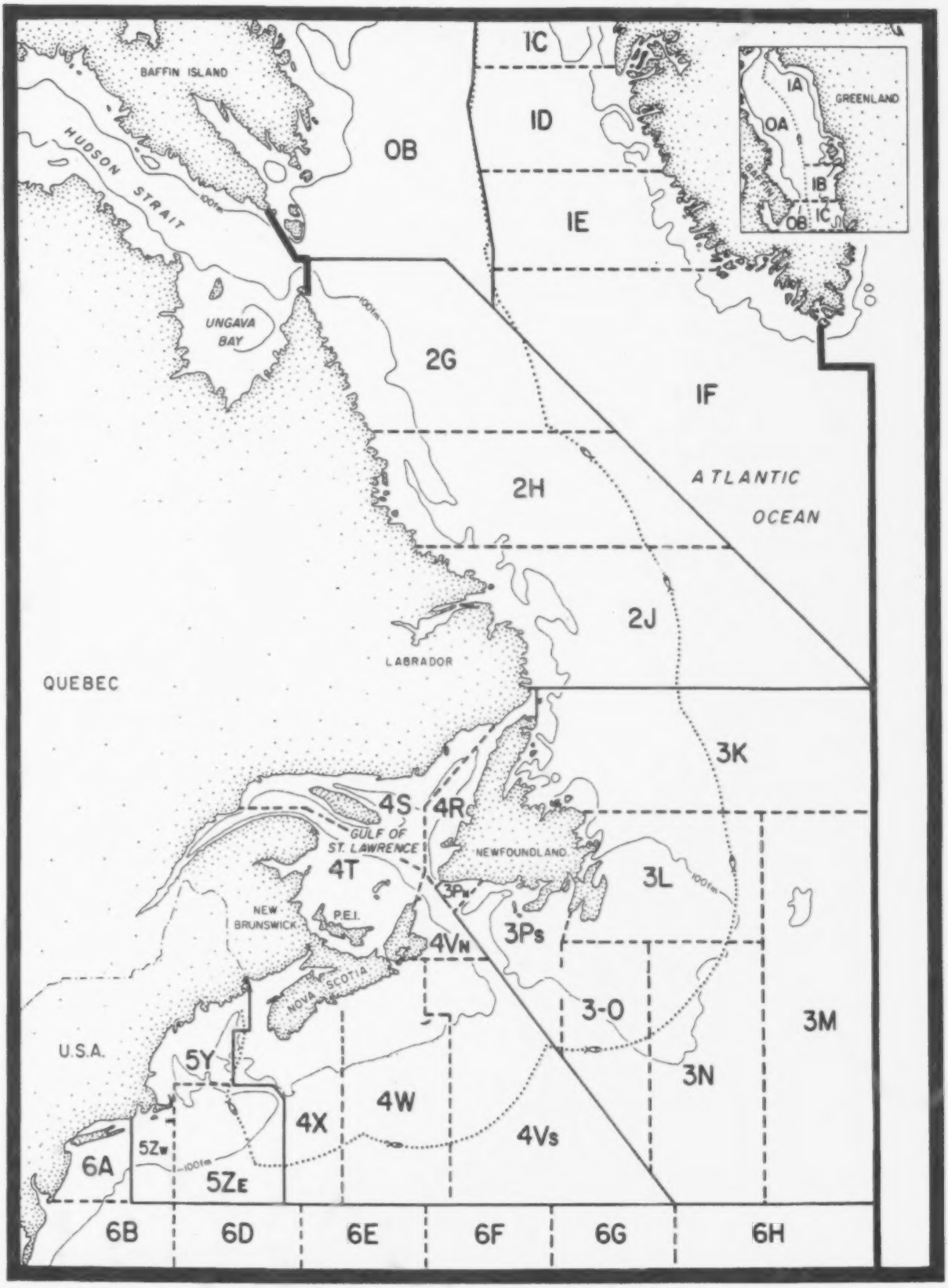
VPA: Virtual Population Analysis

ZAP: Zonal Assessment Process

200 Mile Fishing Zone and NAFO Fishing Boundaries



200 Mile Fishing Zone and NAFO Fishing Boundaries



Canada